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An "American" Health Program*

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THE current discussion of a national health program has developed almost as many views as there are viewers. The health officer sees it from the angle of prevention, and is often disposed to doubt the wisdom of mixing prevention with cure. The physician's view is based upon his clinical interest in the individual patient, and he is often skeptical of alleged general facts such as those from illness surveys. The statistician has implicit faith in his figures based upon the mass approach. The social reformer, armed with the statistician's figures, sometimes reaches very positive generalizations hard for his medical colleagues to accept. The physician points out that neither the statistician nor the social worker has ever heard a professor of medicine admonish his students that there are two words for which there is no place in medicine: "never" and "always." Then, there is the "average man," who does not fully comprehend the discussion but feels acutely the cost of illness, and especially the disaster of preventable illness and premature death. He is confused or grows impatient when told much of his illness is preventable, or that he has ready access to competent medical care whether he can pay for it or not, or that hospitals are losing money and doctors are making a poor living.

This confusion of conflicting views is worse confounded by misunderstanding and careless use of terms. For instance, "State Medicine" is freely used by those who would condemn it, yet rarely does the user attempt to define the term. Prophets announce with pontifical profundity that "socialization of medicine is coming," apparently not recognizing that it is here and has been here for decades. Every large hospital is a form of socialized medicine. Group practice, clinics, industrial medicine, health departments, nearly all salaried medical occupations, and, in fact, organized medicine itself, are forms of socialization.

Open and free discussion is one of the virtues of a democracy. We must expect that in a field so complex as health, fresh discussion will inevitably

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produce divergent views and confusion at the start, especially when we reflect that much of our public health and public welfare program in this country has developed along opportunistic lines. There is value in careful study of the multiple aspects of any problem. Serious consideration of the honest views of all concerned will in time clarify confusion and produce a wiser and sounder conclusion.

The real question which confronts us all—health officer, physician, social worker, and the public—is this: Can we attain for this country, in our own American way, greater security from disease hazards, greater social use of our unexcelled health protecting and health restoring devices, without too much loss of freedom and without political domination of medicine? If we will keep this question foremost in our minds, we are less likely to allow differences of viewpoint and confusion of terms to obstruct progress. The question is of primary importance to us all. It transcends partisan or vested interests. Its solution calls for clear thinking, calm interchange of ideas, simplicity of terms, unimpassioned discussion, and unprejudiced experimentation.

To the reasonably well informed and the unbiased, certain ideas begin to emerge which may help provide some of the answers to this problem. They are presented here without the endorsement of any organization. They represent only our individual opinions. These suggestions might constitute a tentative platform for an "American" health program—one that would utilize our resources, respect our more valued traditions, and avoid our involvement in regimentation arising from faulty, decadent, or discouraged European ideologies. Its application must certainly be partial, varied, and experimental. No "American" health program can become universal or complete over night. The planks in such a platform must be flexible to conform with accumulating experience. Their relative value will change with developments.

At the present moment there appear to be five approaches, or planks, upon which an "American" health program could be built:

1. PUBLIC HEALTH PROGRAM

First consideration should be given to a thorough-going public health and preventive medical program, including education as well as practical services. This will aim to decrease, so far as is within our power, the burden of preventable illness. Any degree of success here will cut down the necessity for the more expensive diagnostic and therapeutic facilities, all of which must be paid for, whether by fees, taxes, philanthropy, or insurance. Experience shows that prevention is soon lost sight of when the community becomes distracted with fund raising schemes to pay for the treatment of illness. Though unspectacular and often intangible, prevention is a wise investment. It requires, however, continuous exploitation and promotion, since the more successful it is, the less spectacular it becomes; and the less likely, therefore, to receive financial support. Nothing stimulates the purchase of fire engines like a bad fire, and nothing increases the health department budget like a bad epidemic. Yet, well equipped fire and health departments will prevent bad fires and epidemics. A strong and continuous public health program should be our first plank.

2. PRIVATE MEDICAL SERVICES

A high standard of private medical services must be maintained and fostered. This includes continued and increased funds for the best of medical training, both undergraduate and postgraduate. It also includes ample funds

for the research which is essential to the advance of medicine. It involves adequate compensation for the private practising physician. Even though largely supported by the fraction of the population comprising the upper economic levels private practice, medical education, and research are the germinal fields from which spring much of medicine's growth and progress. These are distinctly American and must be preserved and enhanced.

3. VOLUNTARY PREPAYMENT INSURANCE PLANS

Every encouragement should be given to a wide variety of experimentation with voluntary prepayment plans to cover hospital costs, medical costs, cash indemnity against wage loss, and combinations of the three. Experiments should include cash benefits to cover hospital and medical costs, as well as service benefits with no cash. The structure of these experimental plans should be adapted to local needs, traditions, and choices. Sponsorship may come from any responsible organized groups, such as industries, unions, farm granges, mutual benefit societies, or from medical organizations. In all cases, medical advisory leadership is essential, including proper attention to prevention. As rapidly as they prove successful, these experiments should be expanded to include as large a fraction of the employed population and its dependents as can pay its way into such a program. The more people included in such plans, the fewer will require other types of plans which are less satisfactory because they offer less freedom. Such voluntary prepayment plans might well be encouraged on a commercial group insurance basis with the well established insurance companies, in which the employer participates in the cost. Group sickness insurance with a reliable company, provided by the employer and employee jointly through pay roll deductions, should be an important link in personnel relations, and might lift many employees out of the class of "medical indigents."

4. COMBINATIONS FOR SPECIAL POPULATION UNITS

Full development of voluntary prepayment plans may still leave certain non-indigent groups uncared for, such as scattered agricultural groups, small shopkeepers, and self-employed individuals. Health and medical needs for these units can probably be met best by a combination of adequate public health services, a better implemented private medical practice, and perhaps, in some areas, hospitals and other facilities supported by local funds or by federal or state subsidy. Such subsidies should facilitate but not regiment the practice of medicine, and should vary according to local needs and choices, all the way from providing physicians with free biologicals, essential laboratory services, and access to a hospital which is publicly supported, to a minimum fixed salary or income in isolated instances.

5. STATE SUBSIDY FOR INDIGENTS AND UNEMPLOYED

Hospitalization and medical care at public expense are already fairly widely, though inadequately, available for the indigent and unemployed. They should be continued and enhanced, with medical relief under the supervision of the medical profession. Enhancement should be along the lines of providing competent medical and nursing care where practicable in outpatient clinics and in homes, and should include adequate compensation for physicians rendering care to indigents, on a locally determined fee rather than a salary basis. State or local subsidy will often be essential for areas overwhelmed by indigency, but even here use should be

made, so far as possible, of the freely chosen private practitioner, or of such medical personnel as may have been coördinated under the auspices of private medical units, or voluntary prepayment schemes.

COMMENT

All of these approaches toward disease prevention and care for illness are characteristic of, or at least not antagonistic to, the basic essentials of American democracy. They involve a minimum degree of compulsion, politicalization, and the kind of collectivism (of which compulsory sickness insurance is an example) that in so many countries has been concomitant with dictatorship.

Certainly, it would seem wise and "American" for us to place our chief emphasis on prevention; to do everything to maintain and enhance the standards of private medical practice as essential to a democracy; to experiment as fully as possible with voluntary coöperative means for the extension or socialization of medical facilities before introducing the element of compulsion; to use private medical practice and voluntary medical organizations so far as possible, even when employing state subsidies for service to indigents; and exhaustively to explore the extension of public health and medical facilities in the direction of state-salaried medical services before injecting into the American scene a compulsory, political, nonpreventive sickness insurance program. We should face and accept the necessity for the latter only as a last resort, and in so far as it may seem to be essential in meeting medical needs for those who unfortunately cannot be adequately cared for through other socially safer channels.

Criteria for the Evaluation of Printed Matter*

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DESPITE radio, films, exhibits, and the platform, stories in print are still the basic means by which we give systematic instruction, and the only means by which we can leave our story in permanent reference form with our customer, the public. That enduring quality of printed matter also puts an added burden of responsibility upon the profession, for errors of fact and clumsiness of presentation are preserved for repeated recognition by our colleagues. The good men do on the platform, on film, or on the ether waves is soon interred; the evil that they do in print lives after them.

Why is printed matter good or bad? Why does one carefully prepared publication fall flat and another, hastily composed, strike a chord that dominates a campaign?

The answers are complicated. They may depend upon the time and place and circumstance as well as upon factors which are discernible by examining the publication. There is no substitute for skill and originality. No formula will enable a pedestrian writer to produce best sellers.

It is a critical standard, rather than a quantitative evaluation which will show the way. One cannot offer an Abrams' machine ‡ for the diagnosis of publications. But to match Ruskin's seven lamps of architecture and Lawrence's seven pillars of wisdom, one may suggest seven critical factors by which the probable effectiveness of a printed production may be fairly judged.

1. The first question to be answered with reference to the piece of printed matter is this: *Is the publication directed to a specific audience?*

Professionals—be they doctors, educators, lawyers, or economists—have much to say. They see on every hand the gap between their comprehension and the general ignorance. They surge with interpretations which will clarify the complex and narrow the gap.

Self expression, or the urge to impart such comprehension, is small part of effective writing. Each year thousands of ambitious and hopeful scribblers deluge magazine offices with manuscripts written out of such urges. After the urge was put down on paper the writer guessed hopefully it would look good in *Harper's*, or *Collier's*, or *Hygeia*, or *Esquire*, and mailed it off, eventually to get it back, if return postage

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‡ The Electronic Reactions of Abrams, later developed into the Ellis Microdynameter, were devices which their inventors alleged would enable the diagnosis of most diseases through readings on the dial of an electrical machine attached to the body of the patient. They are discussed in the *J.A.M.A.* for January 6, 1934.

was enclosed. The experienced writer decides first whom he is writing for, considers the reader he must reach, perhaps summarizes his proposal to the editor, and then writes to meet indicated specifications.

What the writer does, so does the motion picture producer in planning his pictures, or the writer of radio scripts, or the producers of cars, coats, shoes, and hats. Self expression is a luxury which keeps professionals poor and often ineffective. So it is not by caprice that I set down the rule, "*start with your audience.*" Too many pieces of health education literature indicate clearly that the reader was an afterthought.

2. Close corollary of that rule is the second question: *Has the publication a planned channel of distribution?*

The audience for which you write must be a coherent entity in the social structure of the community. It cannot be an audience of only analytical existence. One might produce in cancer education, let us say, a publication directed specifically to people with pigmented moles on normally unexposed portions of their anatomies. But since there are no organizational channels through which this group can be singled out, the publication would be difficult to circulate outside of nudist camps. The story of pigmented moles will have to be included in literature of general or other organizable distribution.

This is simply the rule of the market —and you are always writing for a market even though you may not call it that. Know your channels of distribution or you are storing up future wasted effort for the disposal of unmarketable goods. Write for your market.

3. After all, a dud may reach a selected audience through well planned channels. The next criterion, now that we have determined whom the publication will reach and how, relates to purpose: *Is the publication directed to a specific objective?*

That specific purpose may be simply to inform. A publication may inform comprehensively, as in the case of a booklet for school or college use. Or it may inform in an episodic or fragmentary way to create an awareness or recognition of a problem or a service.

In public health education, however, the more usual purpose is that of obtaining action. Sometimes the action is immediate, sometimes the purpose is to paint background, a design for future action, when and if there is occasion for action. Action may be related to personal health as in the taking of a blood test; it may relate to civic action, the support of a legislative or administrative program.

There is no matter of better or worse among these objectives. There is simply a matter of determination. A piece of literature produced to inform comprehensively is not likely to motivate; a motivating appeal may not be well designed to inform. All of which simply says: Know why you are writing, publishing, or purchasing any piece of literature you use. If you don't, don't write, publish, or purchase; you'll waste your money.

4. Selection of the amount and kinds of material to be included depends greatly upon the objective. In line with different objectives there will be many possible answers to the next question: *Does the publication include only the minimum of what the public needs to know?*

The principle of economy is an element of all good style. No publication for lay education can be "comprehensive" in a specialist's sense of that term. Yet one of the commonest criticisms expressed when copy is submitted to a physician, engineer, or any other professional is likely to be in terms of omission—"Can more substance be crammed in?"

Whatever objective is selected, draft your publication as a brief directed to attaining that objective before the bar of your particular audience. Anything which is extraneous to that "main chance," anything which is irrelevant, ornamental, or unpointed, cut as you would a cancer. Each time you halve your copy, you are very likely to double your audience. I might add, you will save in typesetting costs and often enable yourself to set in larger type and find room for illustrations.

In determining what the public needs to know, depend not merely upon what the specialists think the public *ought* to know. Find out what the man in the street already thinks and knows about the subject. In intensive fashion that determination has been made by "Gallup" poll methods in planning a New York City publication, a maternal care folder entitled, "Before the Third Month Begins." * But empirical testing of tentative copy on representative groups before final approval, noting the points which are raised, the points skimmed over, the questions asked, and the comments made will prove useful and sufficient in most cases.

5. Such empirical testing is a necessity, too, if one is to be sure that the fifth criterion is to be attained: *Is the publication written so that every person who gets it will understand?*

That understanding is something which all the other criteria will not guarantee. It is a compound of vocabulary, of explanatory formula, of human interest and vitality. For the general reader you will find no satisfactory vocabulary lists to guide you. But, put out a tentative mimeographed script and try it on fifty ordinary members of the audience you wish to reach. Sit with them, let them check words that do not seem clear or are unfamiliar (and medical writing is full of such words). Find for each a substitute word or phrase, or, if not possible, include a simple definition with your first use of such a word. Note the questions asked; ask questions yourself to be sure that understanding is there.

These are just the time honored methods. David C. Coyle tested the manuscript of "Uncommon Sense" on an old Maine fisherman. In the Public Health Service we tested the manuscript of our first syphilis folder on four different groups: clinic patients, WPA workers, college students, and inmates of an industrial school for girls. One public official has said he always tried his writing on his ten year old child and had a child every year to be sure that there would always be a ten year old to try it on; that is an excellent formula, but local conditions vary and it may not be practical for every health officer.

When such methods are used, the writer must give them meaning by standing ready to rewrite and reorganize. He may be assured he will find it necessary, but also that his final effort will be vastly improved.

6. *Is the publication medically and factually correct in every respect?* The question is not placed sixth as a matter of importance. It is simply set down as a recognized criterion, which should be so clear and so well accepted as hardly to require statement.

Some of the qualifications and possible reservations of rigorous scientific thinking must, however, be avoided. Rigidly apply Koch's postulates and one could not assure the public that

* Published by the District Health Education Demonstration of New York City Department of Health, 1939. Through a preliminary survey it was found that although most mothers registered for medical care in the seventh, eighth, and ninth months of their pregnancy, most (1) believed they *should* go early, (2) knew in a general way the purpose of early care. The publication, therefore, concentrated on emphasizing the importance of early care and describing the facilities available and the mechanics of registration—where and how. Long elaboration of obstetrical facts, which ordinarily smothers the selling point of early registration, was eliminated.

Treponema pallidum is the cause of syphilis; "there is . . . good reason to doubt that pathogenic *Treponema pallidum* ever has been cultivated on artificial media."[1] Pass any manuscript on syphilis, cancer, tuberculosis, or heart ailments to the ten outstanding researchers in the field, and you will discover how tenuous is professional agreement. Give thanks only that it is not lawyers or economists from whom you seek concensus. Nearly every administrative program is a compromise between pure science and applied science. The fact that there can be an administrative program of public health, that facilities can be set up and programs planned, suggests that there is ground for acceptable practical synthesis, which will avoid these disputes. The need for such synthesis is sometimes forgotten and popular writing confused with scientific reporting.

In syphilis education, for example, we were faced with that difficult educational problem of keeping an apparently well man returning for a year and a half to take unpleasant treatments. A statement of statistical probabilities will not lead to success. The patient needs assurance. But no honest doctor could ever promise an individual "cure." The formula which preserved both requirements depended for its truth on the *relative* success and specificity of treatment. "For no other serious disease is there *so* sure a cure." Thus, writing skill can nearly always find the turn of phrase which makes a statement ironclad in even quibbling accuracy.

7. Finally, one must turn to appearance, the form, as a matter of printing, graphic art, skilled and businesslike execution: *Is the publication professionally competent as a production?*

This question will overlap some of the previous questions in its implications. Form must not only be good. It must express the story which the copy tells. Type, picture, chart, and captions must so relate that a single entity is created. These are ideal considerations. Every musical play cannot match the music-libretto fusion of Gilbert and Sullivan, but the incongruous, inept and meaningless may be detected and rejected. One simple test will help: Is the job as well done as the advertising material you receive, and your public receives, from your competitors of the patent medicine trade or from other advertisers who compete for public attention? For colds the public will choose between your advice and that of the Smith Brothers.

If, in addition to its recognized public interest and scientific authority, public health publications achieve that standard, or surpass it, you should win. I say win, because we must never forget that we are competing in a world of frenzied subjectivity with other bids for the attention of the public.

This criterion might be expanded into seven lamps of its own, tests of good production: readability, type, layout, size, picture, caption, and low unit cost. But these are technical problems. One may, in such a paper, give critical criteria to guide administrative judgments, but methods for the production of satisfactory materials cannot be imparted so easily.

. . . . . .

How can these standards be attained? Can the local health officer obtain material of high professional quality for use in his health education program?

For certain audiences, perhaps the larger part of the public, the health officer can meet these standards so long as free material flows from the life insurance companies. It is sometimes weak in "audience analysis" (such criteria especially as No. 1 and No. 4), but most of that material is well written, well produced, and authoritative.

But certainly that stream will not

and should not be expected to flow forever. It has helped build health services, public and voluntary. It has demonstrated the place of printed materials in the health education program. The companies have had the funds to experiment on the necessary significant scale with form and content. As particular services grow, definite pressure should be exerted to make the accompanying educational services a part of the public responsibility. This will be a gain, however uncomfortable it may be to face just now. Private and commercial funds may then be released to experiment further on new frontiers of radio and motion pictures; the public program will have a sounder and more independent base.

It hardly seems a confident and sound basis for the health program when one goes into health departments, school systems, and voluntary agencies, from the rural areas to great industrial cities, and finds that all literature is largesse from insurance companies; nor when one finds no serious contemplation of ever securing any other source of supply. In general it is bad principle to let a legislative body get something for nothing too long. They get to expect it. We have not only to do a catch-as-catch-can job of health education; we have to build a constructive political philosophy that will secure recognition for that service as a value-received job for the community.

Does this mean local production? Except for the occasional special local problem, the answer should be in the negative. The unit cost of such production would make consistently good literature impossible. Such methods, such standards as have been suggested, contemplate secondary research, checking, rewriting, reader analysis, and a type of skilled format and planning that would be expensive on an edition of less than a few hundred thousand. Production is not normally a local problem. Some central agency must offer this service.

The technic of such central service has been very ably demonstrated by the work of the National Tuberculosis Association. In studying that association's service one must take care not to lose sight of the fact that the productive excellence of its materials has been possible only because it has developed a system for distribution before undertaking production. Other voluntary agencies have produced much good material. None, I think, have been able until quite recently to go so far in employing the resources of the graphic arts, and that, because, in going from need to production, they have not solved the intermediate steps of audience analysis and adequate distribution facilities.

In the field of venereal disease control such central production service has been developed by the U. S. Public Health Service. Folders have been prepared for specific audiences—the patient with syphilis, the patient with gonorrhea, the civic group which must be educated to the requirements of a control program, factory workers, and so forth. Professionally written and tested copy, graphic design, and good photography have gone into them. They have been produced to meet a price in quantity lots.[2] That type of work may develop further in the Public Health Service, if the revision of its publications proceeds with consideration of such standards as have been suggested herein, rather than in the matter-of-record tradition, of many government agencies.

In so far as the professional production costs—writing, design, type setting, plating, and storage—are taken care of, the dollar a hundred prices of the Government Printing Office represent economical purchase; and lower prices are offered on larger quantities. It must be admitted, however, that the swad-

dling tape of the federal government requires the Public Health Service to work under difficulties if it is to function as a central agency of supply for such materials. Public Printer A. E. Giegengack has done heroic work to transcend the paralytic rules which hamper good publishing and, thus, to give the taxpayers value received for their Government Printing Office dollar. But to a federal agency, distribution probably presents more hazards than production.

One may illustrate the obstacle to distribution with one recent case. The U. S. Public Health Service publishes as part of this service two excellent pamphlets for physicians, Supplements 5 and 6 to *Venereal Disease Information*. One of these is entitled, "The Diagnosis of Syphilis by the General Practitioner," the other, "The Management of Syphilis in General Practice." Both are from the pen of Dr. Joseph Earle Moore and with the collaboration of the Coöperative Clinical Group.

Some time ago the Bureau of Social Hygiene of the City of New York wished to buy several thousand of each for distribution to New York physicians. The money it wished to use was money received from the federal government, via the state, under the Venereal Disease Control Act.

The bureau found that under its financial controls, it could not send a check to the Superintendent of Document in Washington until the pamphlets were received.

The Superintendent of Documents could not ship the pamphlets until the money was in his hands.

So far no solution has been found; syphilis wins. When two trains meet at a crossing, both shall stop, and neither shall proceed until the other is gone.

One might add that it is important to have this situation continue. Were the Superintendent of Documents to receive discretion to negotiate such matters, were he empowered to use his intelligence as an able and responsible official, the Constitution would no doubt be subverted. We would have a "government of men—and not of laws." I refer you to any debate or editorial on federal reorganization or administrative law to establish the point.

A third possibility is the creation in the National Health Council, The American Public Health Association, The American Museum of Health or elsewhere, of a coöperative publishing service, which can develop skilled production, at cost, for any state, city, and voluntary agencies and achieve the low cost of large scale production. The work of Great Britain's Central Council for Health Education as described in the *Health Education Year Book* for 1939–1940 may constitute a lead toward such service. The writer is not familiar with its production and its achievements and, therefore, cannot elaborate on the possibility.

Wherever the service be lodged, it should make its way on merit and not constitute an exclusive production agency. Any hospital, clinic, or local health department or agency may choose to buy a syphilis pamphlet from the U. S. Public Health Service or the American Social Hygiene Association, or it may choose to produce one for itself. A central agency, if set up, should make good on price and quality in producing for its market.

Whatever the eventual solution, whether it come this year or ten years from now, there is need to think in terms of eventually assuming these responsibilities. Meanwhile, let us apply our seven lamps of criticism vigorously.

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2. See folders numbered 1, 2, 3, 4, 5 of the Venereal Disease Division of the U. S. Public Health Service. Also for publications prepared for individual sale, see Supplements to *Ven. Dis. Inform.*, 4, 5, and 6 prepared for physicians; *The Communicable Diseases*, prepared for students of high school age and general reference; *Sex Education in High Schools*, prepared for teachers.

Biological Standardisation

AT the last session of the Health Committee, Dr. Madsen reported that the number of institutes periodically receiving from the Copenhagen Institute samples of the various international standard sera is increasing and has now reached 75. The Institute is also receiving an ever-growing number of requests for toxins and cultures, which it endeavours to meet, especially in the case of laboratories that are taking up some particular production as a new departure.

The Commission on Biological Standardisation has always taken the view that the method of assay to be adopted should be left entirely to the choice of each institute. In certain cases, nevertheless, the Institute supplies particulars of the techniques it uses, being careful, however, to specify that they must not be regarded as necessarily the best. Serologists from the Argentine, Belgium, Egypt, Italy, Norway, and Thailand visited the Institute last year to acquaint themselves with the methods of assay applied at Copenhagen for purposes of serum standardisation.—*Chronicle of the Health Organisation*, League of Nations, 2, 1 (an.), 1940.

Brilliant Green Lactose Bile and the Standard Methods Completed Test in Isolation of Coliform Organisms

A Comparative Study

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THE use of brilliant green lactose bile as an enrichment and inhibitory medium in the isolation of coliform organisms has been in the minds of water bacteriologists for many years.

This medium did not come into its own, however, until certain workers discovered that, like many other similar media, it is not sufficiently productive to be used as a primary inoculum.[1, 2] With this in mind, a coöperative study was undertaken by the American Public Health Association, a report of which was published [3] to determine the relative efficiency of the 4 outstanding liquid confirmatory media suggested in standard methods.[4] The results indicated the brilliant green bile confirmatory method as the most generally satisfactory of the selective procedures studied, and that it yields results which, with the possible exception of those obtained from finished waters, are usually more accurate than are those secured through the use of the " completed test " alone.

Since such results were obtained on water samples it appeared advisable to consider the use of this medium in the bacteriological examination of shellfish and shellfish-bearing waters, but before adopting the procedure as routine, a study similar to that conducted by McCrady, but using only brilliant green lactose bile, was indicated. This study, started September, 1937, and continued until May, 1939, was conducted over a span of more than 1½ years in order to determine any possible seasonal variations in comparative results, as well as to accumulate sufficient data for accurate interpretation of results.

PROCEDURE

Standard Methods require that the completed test be performed on a tube which shows gas formation from the smallest amount of water tested. It has been our observation that in a great many instances, if this practice were followed, many of these tubes would be found to react negatively, necessitating performing the completed test on tubes containing a larger amount of sample, thereby not only causing a delay of 1 day in obtaining final results but, at the end of 48 hours' incubation of the lactose tubes, many of the coliforms may have been overgrown and possibly lost. Another advantage of brilliant green is that practice has

shown that such positive gas tubes, even if kept over a period of days, still gave fairly pure cultures, were not overgrown, and could be referred to for check, if desired, without fear of a change in the culture. It has therefore been the policy of this laboratory to perform the full completed test on at least two tubes of each dilution showing gas.

In this study, parallel inoculations were made into brilliant green lactose bile (2 per cent) from all lactose broth tubes which were submitted to the completed test, and the amount of gas produced was observed after 24 and 48 hours' incubation. If gas was produced in the brilliant green tube and the colonies on eosin-methylene-blue agar were typical, this was called "agreement" and no further work was done with the brilliant green. However, if no typical colonies were produced on the E.M.B. agar from the lactose broth, and gas was produced in the corresponding brilliant green tube, inoculations were made from the brilliant green to an E.M.B. agar plate and the completed test was carried out from the colonies isolated. Conversely, when characteristic colonies were produced on E.M.B. from the lactose broth and no gas was produced in the brilliant green tube, inoculations were made from the typical colonies to brilliant green and observations for gas were made after 24 and 48 hours' incubation.

RESULTS

A complete statistical account of the results obtained is given in Table 1. The results are classified by months in order to show any seasonal variations, and the samples are divided into two classes; shellfish and water, because it was observed that quite different reactions were obtained with these two types of samples.

Lines 1 and 2 in the table are self-explanatory, being a statement of the number of samples and of gas positive tubes examined. In line 3, an example

FIGURE 1

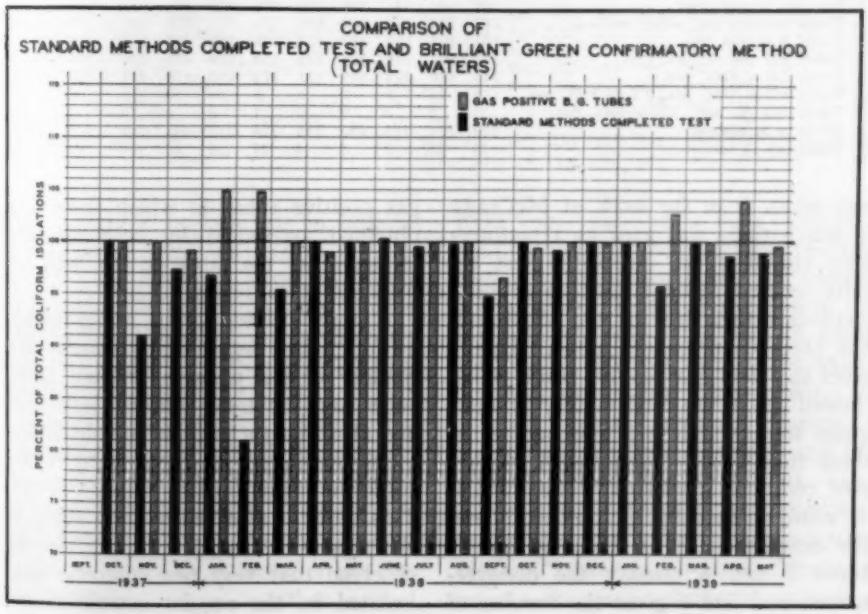

COMPARISON OF
STANDARD METHODS COMPLETED TEST AND BRILLIANT GREEN CONFIRMATORY METHOD
(TOTAL WATERS)
GAS POSITIVE B. G. TUBES
STANDARD METHODS COMPLETED TEST
PERCENT OF TOTAL COLIFORM ISOLATIONS
SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY
1937
1938
1939

TABLE 1

Statistical Data Showing Relations between Regular Standard Methods Completed Test and Brilliant Green Bile Partially Confirmed Test

Total Shellfish Samples

Totals	1937 Sept.	Oct.	Nov.	Dec.	1938 Jan.	Feb.	Mar.	Apr.	May	June	July
1. Samples	66	105	105	85	100	75	106	107	97	109	112
2. Gas pos. lactose tubes	169	275	274	216	327	239	414	238	252	229	295
3. Tubes coliform pos. either method	164	260	225	165	155	121	178	127	181	180	246
4. Tubes B.G. gas pos.	163	261	234	164	170	120	181	128	179	181	247
5. Tubes BG pos. + SMC pos.	162	258	224	161	151	119	178	127	179	180	246
6. Tubes LB + SMC pos.	154	248	214	151	135	102	154	127	160	179	229
7. Tubes BG + SMC pos., LB + SMC neg.	10	12	11	14	20	19	24	0	21	1	17
8. Tubes BG gas neg., LB + SMC pos.	2	2	1	4	1	2	0	0	2	0	0
9. Tubes in agreement	158	260	252	195	300	215	387	237	229	225	273
10. Tubes not in agreement	11	15	22	21	27	24	27	1	23	4	22

Total Water Samples

Totals	1937 Sept.	Oct.	Nov.	Dec.	1938 Jan.	Feb.	Mar.	Apr.	May	June	July
1. Samples		28	17	59	21	77	97	105	38	533	396
2. Gas pos. lactose tubes		80	48	136	68	210	329	214	88	949	688
3. Tubes coliform pos. either method		76	33	113	63	170	128	207	77	922	677
4. Tubes B.G. gas pos.		76	33	112	66	178	128	205	77	919	677
5. Tubes BG pos. + SMC pos.		76	33	112	63	170	128	205	77	919	677
6. Tubes LB + SMC pos.		76	30	110	61	138	122	207	77	922	674
7. Tubes BG + SMC pos., LB + SMC neg.		0	3	3	2	32	6	0	0	0	3
8. Tubes BG gas neg., LB + SMC pos.		0	0	1	0	0	0	2	0	3	0
9. Tubes in agreement		80	48	132	63	170	323	212	88	946	685
10. Tubes not in agreement		0	0	4	5	40	6	2	0	3	3

Total Shellfish Samples

Totals	1938 Aug.	Sept.	Oct.	Nov.	Dec.	1939 Jan.	Feb.	Mar.	Apr.	May	Total
1. Samples	119	195	153	191	66	76	96	163	124	112	2,347
2. Gas pos. lactose tubes	309	542	343	395	150	191	421	722	433	439	6,873
3. Tubes coliform pos. either method	249	501	295	369	125	135	219	459	210	280	4,844
4. Tubes B.G. gas pos.	253	502	295	372	125	143	228	458	234	313	4,941
5. Tubes BG pos. + SMC pos.	249	501	295	369	125	134	219	458	210	279	4,824
6. Tubes LB + SMC pos.	243	486	293	369	121	128	190	379	145	253	4,460
7. Tubes BG + SMC pos., LB + SMC neg.	6	15	2	0	4	5	29	80	65	27	382
8. Tubes BG gas neg., LB + SMC pos.	0	0	0	0	0	1	0	1	0	1	17
9. Tubes in agreement	299	524	341	392	146	174	383	641	368	411	6,410
10. Tubes not in agreement	10	18	2	3	4	17	38	81	65	28	463

was taken from the work of McCrady in which there was used as a performance standard the completed test results secured through the use of both methods rather than by the old Standard Methods procedure alone. Line 4 gives the total gas positive tubes which showed gas in the confirmatory brilliant green tube, and line 5, the number of these tubes which were found to contain coliform organisms. The number of confirmations by lactose broth and the completed test is shown in line 6. Lines 7 and 8 classify the disagreements, and line 9 gives the number of gas positive tubes in which there was obtained agreement by both methods in showing the absence as well as presence of coliforms.

A study of lines 3, 4, 5, and 6 reveals a quite close agreement between the number of gas positive brilliant green tubes and the total coliform isolations, and also that the regular completed test procedure failed to isolate many of the coliforms found with brilliant green. This latter is also shown by a study of the figures in line 7. It will also be observed that very few coliforms were isolated by the regular completed test

TABLE 1 (Cont.)

Statistical Data Showing Relations between Regular Standard Methods Completed Test and Brilliant Green Bile Partially Confirmed Test

Total Water Samples

Totals	1938 Aug.	Sept.	Oct.	Nov.	Dec.	1939 Jan.	Feb.	Mar.	Apr.	May	Total
1. Samples	212	28	86	64	52	21	29	14	48	162	2,087
2. Gas pos. lactose tubes	422	59	158	128	107	51	178	49	167	299	4,429
3. Tubes coliform pos. either method	407	57	154	125	99	39	146	31	155	283	3,962
4. Tubes B.G. gas pos.	407	57	153	125	99	39	150	31	161	282	3,975
5. Tubes BG pos. + SMC pos.	407	57	153	125	99	39	146	31	155	282	3,954
6. Tubes LB + SMC pos.	406	56	154	124	99	39	141	31	153	280	3,900
7. Tubes BG + SMC pos., LB + SMC neg.	1	1	0	1	0	0	5	0	2	3	62
8. Tubes BG gas neg., LB + SMC pos.	0	0	1	0	0	0	0	0	0	1	8
9. Tubes in agreement	421	58	157	128	107	51	169	49	165	295	4,347
10. Tubes not in agreement	1	1	1	1	0	0	9	0	2	4	82

All Samples

Totals	1937 Sept.	Oct.	Nov.	Dec.	1938 Jan.	Feb.	Mar.	Apr.	May	June	July
1. Samples	66	133	122	144	121	152	203	212	135	642	508
2. Gas pos. lactose tubes	169	355	322	352	395	449	743	452	340	1,178	983
3. Tubes coliform pos. either method	164	336	258	278	218	291	306	334	258	1,102	923
4. Tubes B.G. gas pos.	163	327	267	276	236	298	309	333	256	1,100	924
5. Tubes BG gas pos. + SMC pos.	162	334	257	273	214	289	306	332	256	1,099	923
6. Tubes LB + SMC pos.	154	324	244	261	196	240	276	334	237	1,101	903
7. Tubes BG + SMC pos., LB + SMC neg.	10	12	14	17	22	51	30	0	21	1	20
8. Tubes BG gas neg., LB + SMC pos.	2	2	1	5	1	2	0	2	2	3	0
9. Tubes in agreement	158	340	300	327	363	385	710	449	317	1,171	958
10. Tubes not in agreement	11	15	22	25	32	64	33	3	23	7	25

All Samples

Totals	1938 Aug.	Sept.	Oct.	Nov.	Dec.	1939 Jan.	Feb.	Mar.	Apr.	May	Total
1. Samples	331	223	234	255	118	97	125	177	177	274	4,434
2. Gas pos. lactose tubes	731	601	501	523	257	242	599	771	600	738	11,302
3. Tubes coliform pos. either method	656	558	449	494	224	174	365	490	365	563	8,806
4. Tubes B.G. gas pos.	660	559	448	497	224	182	378	489	395	595	8,916
5. Tubes BG gas pos. + SMC pos.	656	558	448	494	224	173	365	489	365	561	8,781
6. Tubes LB + SMC pos.	649	542	447	493	220	167	331	410	298	533	8,360
7. Tubes BG + SMC pos., LB + SMC neg.	7	16	2	1	4	5	34	80	67	30	446
8. Tubes BG gas neg., LB + SMC pos.	0	0	1	0	0	1	0	1	0	2	25
9. Tubes in agreement	720	582	492	520	253	225	552	690	533	706	10,757
10. Tubes not in agreement	11	19	3	4	4	17	47	81	67	32	545

which did not produce gas in brilliant green; there being only 25 of these of a total of 8,806 coliform isolations. This should be compared with 446 isolations with brilliant green medium not obtained through the lactose broth completed test.

The relative efficiency of these two methods as a criterion of the presence of coliform organisms is expressed graphically in Figures 1, 2, and 3. In these, the results of the experimental work are expressed in terms of per cent of the total isolations by either method. With water samples, a very close correlation was obtained between the two methods, there being only 4 months during which the variation between the two methods was 5 per cent or more, and only 1 month in which the variation was greater than 10 per cent.

With shellfish samples, however, a greater variation was obtained and the general picture would indicate some factor which occurs at particular seasons of the year. It will be noted from Figure 2 that the greatest differences between the two methods were obtained

FIGURE 2

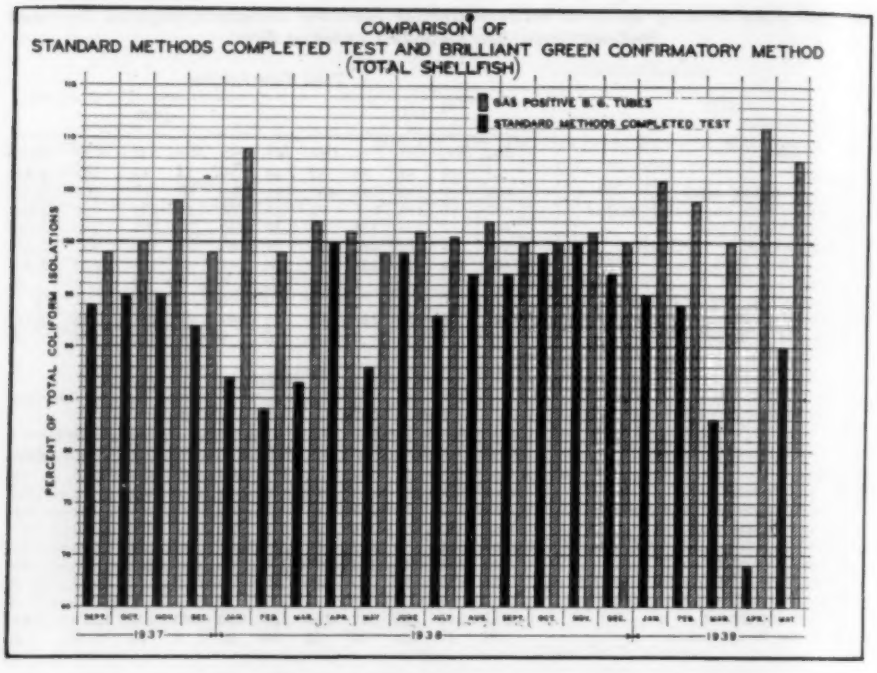
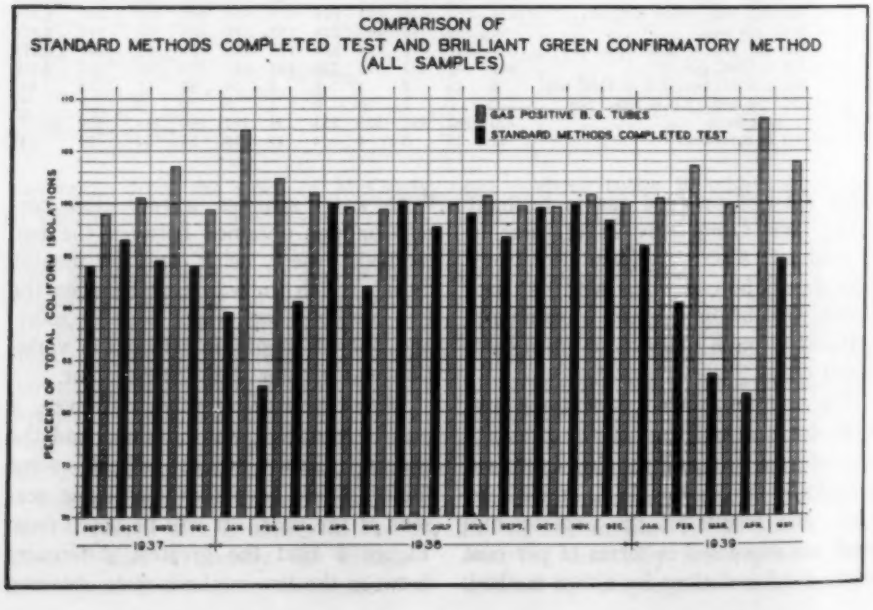


FIGURE 3



during the late winter and spring months. It will also be noted that in most cases, the figures for brilliant green were almost invariably nearer those for the total isolations than were those for the Standard Methods procedure, and that a greater number of isolations were almost always obtained through brilliant green. The latter indicates quite definitely that the brilliant green acts as an enrichment medium for attenuated forms which could not otherwise produce typical colonies on E.M.B. Figure 3 shows the results obtained on all samples, this being a total of Figures 1 and 2.

An attempt was made to isolate the organisms causing fermentation in brilliant green, but which did not later confirm as coliforms when subjected to the completed test.

A total of 89 of these cultures were studied but the reactions were so varied that no single species could be selected as predominant. In general, however, the organisms were Gram-negative, non-spore-forming bacilli which did not liquefy gelatin. They generally fermented milk, with the production of acid and gas. In a few instances a synergism was observed and when the organisms were separated, neither would ferment lactose broth or brilliant green bile medium.

SUMMARY AND CONCLUSIONS

A study has been made to determine the efficiency of brilliant green bile broth as a confirmatory medium for coliform organisms.

Comparative tests made on 2,087 water samples, of which approximately 90 per cent were sea waters, indicate that the presence of gas in brilliant green bile broth is a more accurate criterion of the presence of coliforms than the Standard Methods completed test using solid confirmatory media alone.

Similar results were obtained on the 2,347 shellfish samples but not so marked. Definite seasonal variation was observed.

Considering the total of 4,434 samples, from which 11,302 gas positive tubes were examined, gas production in brilliant green bile broth was obtained with 101.2 per cent of the total coliforms isolated by both methods while the Standard Methods completed test recovered 93.8 per cent.

If the presence of gas in brilliant green bile were considered final indication of the presence of coliform organisms, it would be possible to conduct a confirmation on all gas positive lactose tubes, thus eliminating speculation on those tubes which, because of the amount of work required, could not be confirmed by the usual completed test.

NOTE: Acknowledgment is made to M. A. Satzman and M. Lieber for their technical assistance in the collection of the data contained in this paper.

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Influence of Organic Acids, Sugars, and Sodium Chloride upon Strains of Food Poisoning Staphylococci*

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THE importance of staphylococci in food poisoning has not been fully appreciated until comparatively recently. In many cases staphylococci were isolated but no particular importance was attached to their presence—all the emphasis being placed on bacteria of the Salmonella and botulinum groups. Owen [17] first called attention to the possibility of staphylococci being a cause of food poisoning when he isolated a staphylococcus from dried beef which had caused acute gastroenteritis in consumers. Eight years later Barber [1] isolated a white staphylococcus from milk which had caused gastrointestinal disturbances. Later Dack, *et al.*[7] isolated a yellow hemolytic staphylococcus which was present in considerable numbers in sponge cake which had caused illness in 11 persons. Investigations have shown beyond question that staphylococci are capable of causing food poisoning and should be one of a group of bacteria suspected in any outbreak.

In view of these facts, and since staphylococci as a group are more resistant to physical and chemical agents than are some of the asporogenic bacteria usually suspected in food poisoning, a study was made of the resistance of typical strains to some of the chemical agents commonly found in food, such as acids, sugar, and salt.

LITERATURE REVIEW

Influence of Acids:

Wolf and Harris,[26] Norton and Hsu,[16] and Bial [2] were of the opinion that the degree of acidity rather than the nature of the acid was the controlling factor in the germicidal and antiseptic actions of the acids. Kronig and Paul [15] came to the same conclusion but attributed the many exceptions of a strict parallelism to the anion or the undissociated molecule.

Paus [18] and Johannessohn,[12] working with fatty acids, concluded that there was little relation between the hydrogen ion concentration and growth, but that the kind of acid as well as the acidity was responsible for the germicidal value.

Winslow and Lochridge [25] found that the mineral acids exerted an effect proportionate to the hydrogen ion concentration, while the toxicity of the organic acids was due not mainly to hydrogen ions, but to the action of the

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undissociated molecule, varying widely, as might be expected, with the acid employed.

The germicidal action of the organic acids was studied in detail in 1932, by Reid,[21] who concluded that the resistance of *Bacillus pyocyaneus* is not constant, but varies with the kind of acid. The mono-basic acids, the least dissociated of the acids used, inhibited growth at a much lower hydrogen-ion concentration than the highly dissociated acids.

A wide difference was found to exist between the ability of an acid to exert a bactericidal effect and to inhibit growth. Acids which were strongly bactericidal frequently exhibited weak inhibiting powers in liquid media. Acetic, propionic, and butyric, which were weakly bactericidal, were among the most strongly inhibiting of all the acids tested.

It appeared that the bactericidal action of the weaker organic acids was not alone dependent upon the cations but the undissociated molecules were also active in this respect.

Influence of Salt:

In 1910 Pettersson[20] studied the influence of salt upon the bacterial flora and the decomposition of fish. With low concentrations (0–8 per cent) the flora was heterogeneous, containing both rods and cocci. Between 12 and 15 per cent concentration of salt the rods were killed while the cocci were plentiful in 18 per cent concentration after 15 days.

Karaffa-Karbutt[14] found salt possessed weak bactericidal power. Eight to 9 per cent inhibited the colon group while the pyogenic bacteria required 10 to 12 per cent. On the other hand, Falk[10] found that micrococci and sarcinae, because of their form of growth, could withstand about 15 per cent of salt.

In general, the physiological activity of the streptococci and non-spore-forming rods became greatly limited as the salt concentration approached 8 per cent, while the micrococci and sarcinae could withstand about twice this concentration.

Influence of Sugars:

Not much information is available on the effect of concentrated sugar solutions upon bacteria.

In 1909 Bitting[3] studied the effect of sugar on the molds and yeasts of tomato juice. No effect was noted until the concentration of sugar reached 25 gm. per 100 cc., where the growth occurred readily but less abundantly. The yeast was completely inhibited in concentrations above 30 gm. per 100 cc.

In the same year Pederson and Breed[19] concluded sugar was ineffective as a preservative in catsup. Even 25 per cent concentrations inhibited certain types only. It was found that 15 per cent of sugar and 3.5 per cent of salt inhibited growth of all organisms used except the yeast.

Sackett[22] studied the longevity of members of the colon-typhoid group in pure alfalfa honey. It was found that the organisms remained viable longer in the pure honey than in dilutions above 50 per cent. The failure of the organisms to die out as readily in concentrated honey as in the dilutions was believed to be due to the fact that the former is a saturated colloidal solution, and, as such, has a low osmotic pressure. In such a solution the plasmolysis would take place relatively slowly. When water was added, some of the sugar would form a molecular solution, increasing the osmotic pressure and hence the rate of plasmolysis.

Verification of Strains:

In the past few years much work has been done in an attempt to test the strains of staphylococci for production of the enterotoxic substance.

In 1936 Stritar and Jordan[23] concluded that the food poisoning staphylococci agree with other members of the group in not constituting a clearly marked division.

Woolpert and Dack,[27] comparing the enterotoxic substance with the other toxic products produced by staphylococci, obtained evidence indicating the former to be distinct from the hemolysin, dermotoxin, and killing toxin formed in the filtrates of broth cultures of these organisms.

In 1934 Chapman, *et al.*[5] showed the importance of the coagulase and hemolysis tests as measures of pathogenicity, and in 1936, the use of crystal violet agar. Later Chapman, *et al.*[4] suggested a procedure for the isolation and identification of food poisoning strains.

Briefly, the pathogenic strains of staphylococci on isolation react positively to hemolysis, pigment production, coagulase test, crystal violet test, brom thymol blue test, mannitol fermentation and lactose fermentation. On degeneration, a pathogenic strain is regarded as pathogenic as long as it produces coagulase, or if coagulase production is lost, as long as it retains both pigment and hemolysin production.

EXPERIMENTAL

In studying the factors affecting the viability of staphylococci in the acids, sugars, and sodium chloride, only those strains were used which have been isolated from food poisoning outbreaks.

ORIGIN OF STRAINS

No.	*Isolated*
85	By the New York State Department of Health (1932)
86	By the New York Department of Health (1932)
87	By the New York State Department of Health (1932)
100	From cake, 4, 23, 1932
141	From cholocate eclair, 6, 6, 1933
161	From sandwiches, 1930
166	From hard cheese, 1, 9, 1937
168	From custard eclair, 4, 28, 1937
169	From cholocate eclair, 5, 28, 1937

NOTE: The writers are indebted to Dr. E. R. Hitchner, University of Maine, for strains 85, 86, and 87; and Dr. G. M. Dack, University of Chicago for the strains 100 to 169.

These strains, together with one of *Staphylococcus albus*, were tested according to the procedure suggested by Chapman, *et al.*[4] The results are shown in Table 1.

TABLE 1

The Reactions of the Various Strains as Tested According to the Technic of Chapman, et al.

	Strain Number									
Test	*85*	*86*	*87*	*100*	*141*	*161*	*166*	*168*	*169*	*S. alb.*
Pigment	+	+	+	+	—	—	+	+	+	+
Coagulase, human	+	+	+	—	—	+	—	+	+	+
Coagulase, rabbit	+	+	+	+	+	+	+	+	+	—
Hemolysin, rabbit	+	+	+	+	—	—	+	+	+	—
Crystal violet	+	+	+	±	±	±	+	+	+	—
Brom thymol blue	+	+	+	+	+	+	+	+	+	+
Mannitol fermentation	+	+	+	+	+	+	+	+	+	+
Lactose fermentation	+	+	+	+	+	+	+	+	+	+

Table 1 indicates that all the strains were pathogenic with the exception of No. 141 and the strain of *Staphylococcus albus*. However, since some of the pathogenic strains were found to have partially degenerated, as shown by the several negative tests for coagulase, hemolysis and pigment, the typical strains chosen for use throughout the following experiments were Nos. 85, 86, 87, 168, 169 and for purposes of comparison, the non-pathogenic strain of *Staphylococcus albus*.

METHODS

Many fruits, vegetables, and fermented foods such as sauerkraut, con-

tain considerable amounts of naturally occurring organic acids which play a rôle in food preservation. In studying the effect of acids upon staphylococci, those commonly found in foods and food products were used; namely, acetic, citric, lactic, malic, and tartaric. For comparison, benzoic and the mineral acid, hydrochloric, were used.

The medium employed was 1 per cent dextrose broth having an initial pH of 6.8–6.9. All the acids except benzoic were made up to 0.1 normal, sterilized by filtration, and added aseptically to the sterile broth. In order to obtain different concentrations, various amounts of the acids, measured in cc., were added to 10 cc. of the broth. Since benzoic acid was found to be insoluble to the extent of a 0.1 normal solution, a saturated solution was made of benzoic acid in 1 per cent glucose broth. This resulted in a 0.03 normal solution.

The test tubes were seeded with a known number of organisms, incubated at room temperature, and at intervals the number of viable organisms was determined by the plate method using standard nutrient agar.

The determination of the pH was performed according to the electrometric method, using a quinhydrone electrode.

ANTISEPTIC AND GERMICIDAL ACTION OF ACIDS ON DIFFERENT STRAINS OF STAPHYLOCOCCI

In order to study the relative inhibiting effect of each of the acids on the various strains of staphylococci, a 0.1 normal solution of each acid was made and various amounts in cc. quantities were added to 10 cc. of 1 per cent dextrose broth. The broth was then incubated for 1 week at room temperature, and subcultures were made by transferring 0.1 cc. from each tube into 10 cc. of broth and incubating for 3 days. The acids were considered to exert an inhibiting effect if there was no visible growth in the original tube, but growth in the subcultured tubes. The results are found in Table 2.

After determining the effect of the various concentrations of acids the work was repeated and at intervals the number of viable organisms was determined by plate counts using standard nutrient agar. The plates were incu-

TABLE 2

The Number of Cubic Centimeters of 0.1 Normal Acid Necessary to Exert an Inhibiting Effect upon the Different Strains of Staphylococci

No. Strain	cc. of 0.1 Normal Acid Added to 10 cc. Broth					
	Acetic	*Citric*	*Lactic*	*Malic*	*Tartaric*	*HCl*
85	2.0	2.5	1.0	2.0	2.0	1.5
86	2.0	3.0	1.0	2.0	2.0	1.5
87	2.0	2.0	1.0	2.5	2.0	1.5
Staph. alb.	1.5	2.0	2.0	2.0	2.0	0.75
168	2.0	4.0	1.5	3.0	1.5	1.5
169	2.0	4.0	1.5	3.0	1.5	1.5

TABLE 3

The Number of Cubic Centimeters of Each Acid Necessary to Exert a Germicidal Effect upon the Different Strains of Staphylococci

No. Strain	cc. of 0.1 Normal Acid Added to 10 cc. Broth					
	Acetic	*Citric*	*Lactic*	*Malic*	*Tartaric*	*HCl*
85	3	3	3	3	3	2
86	3	5	3	3	3	2
87	3	2	2	3	3	2
Staph. alb.	2	3	3	2	3	1
168	3	5	2	5	2	2
169	3	5	2	5	2	2

bated at room temperature and counted after 3 days.

Due to the disagreement among several of the previous workers as to the relative importance of the hydrogen ion concentration in actions of this type, it was advisable to determine the pH of each concentration of acid which was found to exert an antiseptic or germicidal effect. The determinations are shown in Table 4.

TABLE 4

Showing the Decreasing Order of Antiseptic and Germicidal Value of the Different Acids Together with Their Dissociation Constants

Acid	*Germicidal pH*	*Acid*	*Inhibiting pH*	*Dissociation Constant*
Acetic	4.37	Acetic	4.59	1.86×10^{-5}
Citric	3.87	Lactic	4.27	1.38×10^{-4}
Lactic	3.80	Citric	4.06	8.00×10^{-4}
Malic	3.74	Malic	3.98	4.00×10^{-4}
Tartaric	3.65	Tartaric	3.92	1.10×10^{-3}
HCl	2.43	HCl	2.94	Probably 95–97%

The results for benzoic acid show that a 1 per cent dextrose broth saturated with this acid has a pH of 3.47, and was definitely germicidal. Just what pH above this would be germicidal was not determined.

The arrangement shown in Table 4 indicates that, in general, the antiseptic and germicidal power of the acids used parallel except in the case of lactic acid, which has a stronger antiseptic action than germicidal action. The reverse is true for citric acid. It is seen that a difference exists between the ability of an acid to exert a germicidal action and to inhibit growth. This is in support of the conclusion reached by Reid.[21]

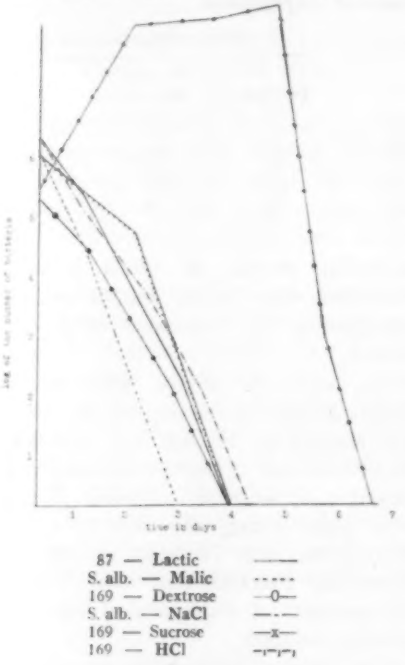
The arrangement of activity is also especially significant in view of the fact that the dissociation constants of the acids used are practically the reverse. Hydrochloric acid and tartaric acid, having the highest dissociation constants, exert the weakest germicidal and antiseptic action, while acetic acid, with the lowest dissociation constant, exerts the strongest action. This supports the findings of Clark[6] and Yaoi[28] and others who believed the un-ionized molecules are prominently concerned, since the toxic effect is not in direct proportion to the degree of dissociation.

It was found that the order of germicidal activity does not appear to be entirely consistent but varies with the strain used. This might be explained as being due to the fact that since the un-ionized molecules play a prominent rôle, it is natural that the negative radical may bring about a specificity of reaction to such an extent that one and the same acid might act differently on different organisms. In this connection Yaoi[28] found that some acids vary greatly in their accelerating or retarding effect upon bacterial growth when applied to the medium in low concentrations. The inorganic acids, HCl and HNO_3, stimulated the growth. On the other hand, organic acids on the whole have no stimulating effect with the exception of acetic and oxalic acids, which, however, have much less stimulating power than HCl and HNO_3. This stimulating effect might explain the slightly weaker antiseptic action of acetic acid as compared to some of the others tested.

The order of antiseptic potency was found to be about the same for all the organisms tested, the order being acetic > lactic > citric > malic > tartaric > hydrochloric.

It was found that one and the same organism does not react in the same way to all of the acids. Figure 2 shows that during the first 24 hours, strain number 85 is rather resistant to the action of malic (3 cc.) and tartaric acid

FIGURE 1—Typical curves showing the effect of some acids, sugars, and sodium chloride on strains of food poisoning staphylococci



(3 cc.). During this same period it is very susceptible to the action of acetic and lactic acids.

Figure 2 also indicates that the strain of *Staphylococcus albus* is more resistant to the action of acetic and tartaric acids during the first 24 hours than it is to the other acids tested. The same resistance, though to a lesser extent, was found for strain 169 to acetic acid.

In order to determine whether the resistance was truly characteristic of the organism, the resistance of strain 85 to a higher concentration of malic acid (4 cc.) was determined. Figure 2 shows that although the time required to kill all the organisms was shortened, the resistance during the first 24 hours was as great as in the lower concentration of acid. This indicates that the resistance or susceptibility of the organism in the presence of acid is, to a certain extent, specific for each acid and organism.

INFLUENCE OF SUGAR AND SODIUM CHLORIDE ON DIFFERENT STRAINS OF STAPHYLOCOCCI

In determining the effect of sugars upon the organisms, dextrose and sucrose were added to sterile sugar free broth and autoclaved at 12 lbs. pressure. Both sugar and salt concentrations were made up by volume.

The tubes were inoculated and incubated at room temperature for 1 week. An inhibiting concentration was considered as one in which there was no growth in the original tube, but growth on subculturing. The results of this experiment are found in Table 5.

From Table 5, it can be seen that the strains are comparatively resistent to the action of both sugars and salt.

About 40 to 45 per cent of dextrose was required to exert antiseptic action as compared with 50 to 60 per cent of sucrose, and 15 to 17.5 per cent of salt.

FIGURE 2—Showing the resistance of certain strains of food poisoning staphylococci to certain acids

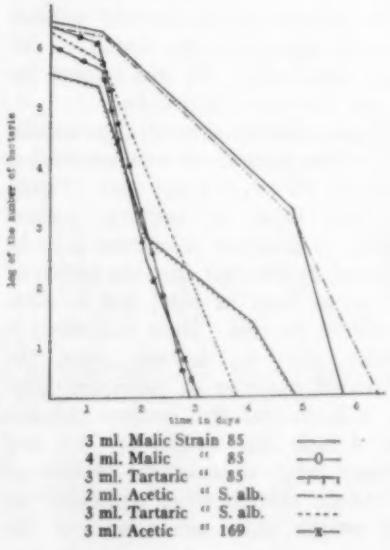


TABLE 5

The Per cent of Dextrose, Sucrose, and Sodium Chloride Exerting an Inhibiting and Germicidal Effect upon the Different Strains of Staphylococci

	Inhibiting Concentration			Germicidal Concentration		
	Per cent			Per cent		
Strain	Dextrose	Sucrose	NaCl	Dextrose	Sucrose	NaCl
85	35	50	17.5	40	60	20.0
86	40	50	15.0	50	60	20.0
87	40	50	15.0	50	60	20.0
Staph. alb.	35	50	20.0	40	60	22.5
168	45	60	17.5	50	70	20.0
169	45	60	17.5	50	70	20.0

The graphs in Figure 1 indicate that there is a great difference between the action of dextrose and sucrose. Vigorous growth took place even when the latter was present in large amounts. This phase was then followed by a period during which growth was materially checked although no decided reduction in numbers was apparent. Repeated observations showed that after 5 days the number of organisms rapidly decreased and at the end of 7 days all the organisms were killed.

This rapid decrease might be explained as due to the combined effect of the sucrose and the acid which was produced during the period of vigorous growth.

Dextrose, on the other hand, produced no such curve and the number of viable organisms was found to decrease continually. In this respect the salt and dextrose acted alike.

Sodium chloride exerted a germicidal effect when present in a concentration as low as 20 to 22.5 per cent (Figure 1). The order of activity, sodium chloride > dextrose > sucrose is to be explained by the fact that the action of each is, at least in part, due to plasmolysis of the cell. Since this effect is additive, that is, depends upon the number of particles or molecules present, it is natural that sodium chloride with a molecular weight of 58.5 and dextrose with a molecular weight of 180 would contain more molecules per unit weight than would sucrose the molecular weight of which is 342. Therefore, the activity should tend to decrease as the molecular weight increases.

The effect of sucrose upon several strains of food poisoning staphylococci was studied by Hucker and Haynes[11] who found that in broth containing high amounts of sucrose, vigorous growth took place during the first 24 hours. During the next 24 hours growth was materially checked, and after 5 days the numbers of staphylococci were materially reduced.

Our results agree with the conclusions reached by Hucker and Haynes. Figure 1 shows a rapid growth rate during the first 24 hours, followed by 4 days during which the numbers of bacteria remain rather constant. On the 5th day a very rapid decrease was apparent, and at the end of 7 days all the organisms were killed.

The action of sodium chloride, as shown by Figure 1, bears a closer resemblance to the acid curves than to those of sucrose. The action of the organic acids is attributed to the specific molecule and the specific potency of both ions, while the effect of sucrose is principally one of plasmolysis. Hence, the appearance of the curves indicates the importance of the potency of the ions in the action of sodium chloride. This conclusion supports that reached by Eisenberg,[8] Fabian and Winslow,[9] and others who have indicated that the action of a salt is a

function of the action of both ions as well as the osmotic pressure involved.

EFFECT OF MIXTURES OF ACID WITH SUGARS, AND ACID WITH SODIUM CHLORIDE

After determining the concentration of acids, sugars, and sodium chloride exerting an inhibitive effect, the effect of mixtures of acid with sugars, and acid with sodium chloride was determined.

The broth was made up as described with varying amounts of dextrose, sucrose, or sodium chloride. To 10 cc. amounts was added the cc. of acid found to exert an inhibiting effect (given in Table 2), and the resulting concentration of dextrose, sucrose, or sodium chloride calculated.

In the same manner one-half the inhibiting concentration of acid was added to varying amounts of sugars and salt.

DISCUSSION

Pederson and Breed [19] have shown that a combination or association of various germicidal and inhibiting substances might take place when each agent in the combination is used in a per cent which, when alone, is not sufficient to bring about such action. With this in mind mixtures of sugars and acid, and mixtures of salt and acid were prepared.

It was found that dextrose in low concentrations (5 to 17 per cent) was able to bring about a germicidal effect within 7 days in combination with an inhibiting concentration of acid. In general, less dextrose was required to bring about a germicidal effect with acetic and hydrochloric than with the other acids (Table 6). On the other hand, when one-half the inhibiting concentration of acid was used, the amount of dextrose necessary to bring about a germicidal effect was about the same for all the organisms and acids (Table 7).

With the inhibiting concentration of acid, sodium chloride was more effective with HCl than with the other acids under consideration. Five per cent exerted a germicidal effect while 10 to 12 per cent was required for the other acids (Table 6).

In the presence of the inhibiting amount of acid, sucrose was effective at a concentration of 20 to 30 per cent with hydrochloric acid, while with the other acids, the amount was somewhat higher, being 30 to 40 per cent (Table 6).

TABLE 6

The Average Amount of Dextrose, Sucrose, and Sodium Chloride in Per cent to Bring about a Germicidal Effect when Added to the Inhibiting Concentration of Acid

	Acid						Per cent Reduction
	Acetic	Citric	Lactic	Malic	Tartaric	HCl	
Dextrose	12	17.0	15	17.0	17	5	60
Sucrose	40	34.0	40	35.0	37	26	50
NaCl	11	11.6	10	9.2	10	5	50

TABLE 7

The Average Amount of Dextrose, Sucrose and Sodium Chloride in Per cent Required to Bring about a Germicidal Effect when Added to One-half the Inhibiting Concentration of Acid

	Acid						Per cent Reduction
	Acetic	Citric	Lactic	Malic	Tartaric	HCl	
Dextrose	25	24	25.0	25	25.0	25	50
Sucrose	52	..	....	..	....	..	20
NaCl	16	15	13.4	14	13.8	15	30

When the inhibiting concentration of the acid was reduced one-half, sucrose was not very effective in that 50 to 55 per cent was required to exert germicidal action (Table 7).

CONCLUSIONS

1. Although the action of the highly dissociated mineral acid is due mainly to the hydrogen ion concentration, the organic acids exerted a germicidal and antiseptic effect disproportionate to the hydrogen ion concentration produced. Therefore, it is apparent that the observed effects are due to factors in addition to the hydrogen ion, presumably either the un-ionized molecule or the anion or both.

2. The difference in the action of the various organic acids upon one and the same strain of staphylococci is believed to be due to a specificity of reaction likewise brought about by either the anion or undissociated molecule, or both.

3. The decreasing order of germicidal action of the acids was found to be acetic >citric>lactic>malic>tartaric>hydrochloric.

4. The decreasing order of antiseptic action was found to be acetic>lactic>citric> malic>tartaric>hydrochloric. In this connection it is interesting to note that citric and lactic acids change places in their antiseptic and germicidal potency.

5. Sodium chloride in a concentration of 15 to 20 per cent exerted an inhibiting effect while a 20 to 25 per cent concentration was definitely germicidal.

6. Dextrose exerted an inhibitive effect in concentrations of 30 to 40 per cent and a germicidal effect at 40 to 60 per cent.

7. Sucrose is less active than either dextrose or sodium chloride since a concentration of 50 to 60 per cent was required for inhibition and 60 to 70 per cent for germicidal action.

8. There was a great difference in the action of dextrose and sucrose upon the staphylococci. During the first 24 hours vigorous growth took place in sucrose even when it was present in concentrations as high as 70 per cent. This phase was followed by 4 days during which the number of viable organisms remained nearly constant. On the 5th day the number of organisms rapidly decreased until the 7th day when all the organisms were dead. With dextrose the germicidal action was apparent at once and uniform throughout.

9. On considering a mixture of sugars and acid, it was found that dextrose was more effective than sucrose in lower concentrations of acids. Neither of the sugars was as efficient as sodium chloride in acid, however. The amount of dextrose which was required to exert a germicidal action could be reduced 50 per cent when used in the presence of one-half the inhibiting concentration of acid. On the other hand, sodium chloride and sucrose, could be reduced only 30 and 20 per cent respectively and still bring about a germicidal effect.

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University of Pennsylvania Bicentennial Conference — September 16-22

A BICENTENNIAL Conference will be held by the University of Pennsylvania, beginning September 16 and ending September 20, 1940, as part of the program marking the observance of the two hundredth anniversary of the University's origin. Membership in the Conference will be by application and is open, within the limit of accommodations, to members of the staffs of invited institutions and organizations.

The program of the Conference will consist of lectures and papers by a group of distinguished European and American scholars and leaders in the various fields of science and thought. The offerings will represent the broad interests and significant contributions to learning. In the field of the Humanities, the Symposia are planned to bring out the continuity of culture. In other fields they will reveal the trends of modern thought and the advances of science. Each paper is on a topic upon which the speaker's published writings and researches give him a peculiar right to speak.

An officer for each division will be appointed to serve the demand of small groups who may desire to meet for informal discussion of questions arising out of the general Symposia.

Among the speakers will be a number who are American Public Health Association members. These will include:

Louis I. Dublin, Ph.D.
Conrad Arnold Elvehjem, Ph.D.
Kendall Emerson, M.D.
Thomas Francis, Jr., M.D.
The Honorable Herbert Clark Hoover
Colonel Raymond Alexander Kelser, D.V.M., Ph.D.
Henry Klein, D.D.S., Sc.D.
Thorvald Madsen, C.B.E., M.D., LL.D.
Elmer Verner McCollum, Ph.D., Sc.D., LL.D.
John Robbins Mohler, V.M.D., Sc.D.
Carroll Edwards Palmer, M.D., Ph.D.
Thomas Milton Rivers, Sc.D., M.D.
Wilbur Augustus Sawyer, M.D.
Richard Harrison Shryock, Ph.D.

Observations on the Durability of Mottled Teeth

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FLUORINE ingestion as the cause of mottled enamel which is endemic in many parts of this country and the rest of the world has been well established.[1, 2, 3]

The observation made by Black [4] in 1916 that mottled teeth appeared to have less caries than so-called normal teeth, has recently received much attention. Dean, *et al.*,[5] have reported that the incidence of caries was appreciably less in the mottled teeth of the 12, 13, and 14 year old children in Galesburg and Monmouth, Ill., schools than in the same age group of the nearby communities of Macomb and Quincy, where mottled enamel was not endemic. Dean and his coworkers, although apparently convinced that the higher fluorine content of the waters of the former cities accounted for the lower incidence of dental caries, were somewhat hesitant to conclude that the fluorine content of the water was the only factor involved because of other differences in the mineral composition of the water supplies, primarily in the amount of calcium and magnesium.

Miller reported experiments with rats in which caries development was inhibited by the inclusion of 250 p.p.m. of sodium fluoride in the caries producing ration. Cox [6] has more recently produced mottled enamel in rat molars, and reports that such teeth are more resistant to caries produced by a corn meal ration, than were the molars formed without the addition of sodium fluoride to the ration. Cox [6] makes rather sweeping conclusions and very broad recommendations for the application of his findings made on rats to the dental ills of the human race. He goes so far as to state that addition of fluorides to community water supplies provides an "attractive means of mass reduction of dental caries; that prophylactic measures through other media such as bottled water, milk supply, and fluorine containing medicinals are feasible; and that means of control of fluorine in the whole dietary of children should be undertaken."

To one who is familiar with the disfiguring dental defect known as mottled enamel which affects the teeth of every person who drinks water containing as little as 1 p.p.m. of fluorine during the years of tooth formation, this recommendation seems, to put it mildly, unsafe. There is ample evidence that mottled teeth, though they be somewhat more resistant to the onset of decay, are structurally weak, and that unfortunately when decay does set in, the result is often disastrous. The chart graphically presents the result of a survey of the situation in St. David, Ariz., a community where water supplies range from 1.6 to 4.0 p.p.m. of fluorine. This survey included the

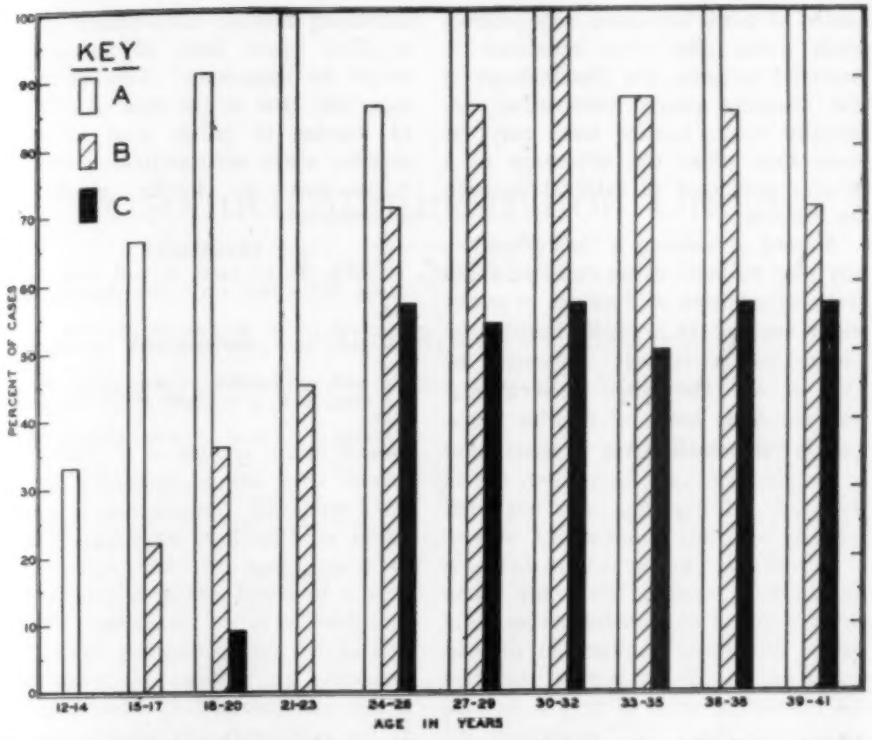

CHART 1—DENTAL SURVEY OF THE MOTTLED TEETH OF THE INHABITANTS OF ST. DAVID, ARIZONA

A. Per cent of age group in which caries was observed
B. Per cent of age group in which some teeth had decayed and been extracted after unsuccessful attempts to repair them
C. Per cent of age group in which all teeth had been extracted and replaced by false teeth

adult group so that a truer picture of the durability of mottled teeth could be obtained.

It may be seen that although only 33 per cent of the children in the age group from 12 to 14 years showed any carious lesions, the percentage of persons with carious teeth increased with age as was to be expected. Beyond the age of 21 years, there were relatively few individuals in which caries had not developed. That the result of the onset of caries was especially severe is reflected in the high percentage of all age groups with extracted teeth. Caries once started evidently spreads rapidly. Steps taken to repair the cavities in many cases were unsuccessful, the tooth breaking away when attempts were made to anchor the fillings, so that extraction was the only course. That decay was widespread and repair was highly unsuccessful among the young adults is shown by an incidence of more than 50 per cent of false teeth in the age group 24 to 26 years. This high incidence of false teeth appeared in all subsequent age groups. Very rarely, adults were found whose teeth, though mottled, were free from caries. It was the exception rather than the rule to find dentitions from which there had been no extractions because of inability to repair carious teeth successfully.

It would appear therefore, that even though fluorine ingestion during the

period of tooth formation may produce teeth which offer more resistance to bacterial invasion, the disadvantage of the resulting poorly constructed, internally weak, mottled teeth may far more than offset the advantage of a greater resistance to external invasion by bacteria.

A word of warning is thus offered to any plan to build caries resistance into teeth by addition of fluorides to public water supplies as a public health procedure so attractively suggested by Cox, *et al.* The range between toxic and non-toxic levels of fluorine ingestion is very small. Any procedure for increasing fluorine consumption to the so-called upper limit of non-toxicity would be hazardous. This would be especially true in the case of addition of fluorine to public food or water supplies where uncontrollable individual fluctuations in intake would be encountered.

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Personnel Administration Under Civil Service*

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THERE is a definite trend toward the extension of the civil service system in government. The New York City Department of Health is under civil service and the management of civil service is in the hands of a very capable commission. It is believed that the varied experiences of the Health Department in meeting its personnel problems under civil service jurisdiction may be of value to communities not at present so covered.

CIVIL SERVICE PROCEDURE

New York City has had a civil service system for many years. In 1934, 91 per cent of the 2,500 employees of the Health Department had civil service status. There were 10 exempt positions at the top and 221 non-competitive positions which could be filled by the Commissioner without restriction. Civil service has since been extended to cover the entire department of 2,900 employees, with the exception of 5 exempt positions.

The civil service procedure in New York City covers not only the method of appointment and discharge, but also establishes titles of personnel and salary grades and governs promotions.

In order to establish a new position in the department, the first step is to have the title approved by the Civil Service Commission and the position accepted in the budget. When this is done, the Civil Service Commission holds an examination to obtain a certified list of qualified candidates. This may take several months or the better part of a year in some instances. In the meantime, the department may secure permission from the Budget Director to make a temporary appointment. When the certified list of eligibles is completed, the temporary appointee must be dropped and the top person on the list appointed. There is a 6 months' probation period for a new employee, during which he can be dropped if his work is not satisfactory.

In the last 6 years there have been appointed 6 most competent bureau directors, all through civil service examination. In one instance, however, due to lack of complete satisfaction with an existing eligible list and to litigation and budget difficulties, one bureau has not yet obtained a full-fledged civil service director.

During the same period there have been 35 people discharged from the department. Charges were preferred, hearings were held before the Commissioner, and the action was taken.

* Read before the Health Officers Section of the American Public Health Association at the Sixty-eighth Annual Meeting in Pittsburgh, Pa., October 17, 1939.

In only one instance was the Commissioner's action reversed in the courts.

DROPPING OF NON-COMPETITIVE PERSONNEL

In the spring of 1934 it was necessary for the city to make drastic cuts in expense. Over a half million dollars was lopped off the Health Department budget. Personnel had to be dropped, positions eliminated. There were a number of people in non-competitive positions, that is, not possessing civil service tenure. They had been appointed over a period of many years. These appointments were not always just what the director of the bureau desired. Necessarily some of the work was of pretty poor calibre. Some of the workers led a rather independent existence. They set their own pace. They apparently had no fear of disciplinary action and seemed to feel a certain security in their positions.

When under the present administration the budget had to be curtailed, there was opportunity to pick and choose among these non-competitive employees. The best ones, the ones who had a good working record, regardless of the fact of their appointment in previous administrations, were retained. The others were dropped. This weeding-out process was a great boon to the bureau. It solved at once some of the problems that had tormented the director for some time.

DROPPING CIVIL SERVICE PERSONNEL

In dropping those in civil service positions, however, there was no chance to pick and choose. Employees had to be dropped in the inverse order of their appointment. The last one appointed was the first to be dropped. This was an unsatisfactory experience because good workers had to go if they were the most recent appointees. If only it had been possible to reach out and drop some of the less efficient workers longer in the department, it would have been beneficial to the service, but civil service regulations did not permit this. In this instance civil service was a handicap to better service.

As vacancies occurred later, the civil service people who had been dropped but who were placed on a preferential list, were eligible again for reappointment. They had to be reappointed in the order of the date of their original appointment. Repeatedly friends of one person well down on the list urged her prompt reappointment. The person in question had no unusual abilities. No explanation could convince them that it was impossible to reappoint their friend until her name was reached on the list, even if there had been a willingness to do so. Incidentally, the individual and her backers were sympathetic to the new city administration. They could not understand why the department could not stretch a point and restore the person promptly in advance of those ahead of her on the list. In this instance, civil service prevented special privilege or personal connections, even if there were a desire to exercise them, from operating unfairly to those on the eligible list.

At the time of this extensive budget reduction a complicated civil service tangle also was encountered. There were a number of varieties of inspectors in the department—sanitary inspectors, industrial sanitary inspectors, and food inspectors. Some of the food inspectors were appointed from a food inspectors' eligible list, some from a city milk inspectors' eligible list, and some from a country milk inspectors' eligible list. Fortunately there were no eligible lists for cabbage inspectors or cheese inspectors. That would have made it still more complicated. Food inspectors were dropped in the inverse order of their appointment to the department regardless of their order on the special-

ized civil service lists. There were protests, and the Civil Service Commission ordered this to be corrected by dropping people according to their standing on the specialized eligible lists. In other words, a country milk inspector longer in the service of the department had to be dropped ahead of a food inspector because the country milk inspectors' list was promulgated after the food inspectors' list. In this instance, civil service regulations, or at least their interpretation, caused considerable complications and ill feeling within the department.

CIVIL SERVICE TITLES

One person long in the service, and most dependable, had the title of "laboratory helper," a somewhat nonspecific title. He drove an automobile and collected cultures from Health Department stations and brought them to the laboratory. Was he working within his title? After this employee had been doing this work for many years, the Civil Service Commission suddenly decided that this was not the work of a laboratory helper. He would either have to be dropped or withdrawn from his present duties and placed within the laboratory, washing glassware and other similar work. In this instance, a man well fitted for the job was judged to be ill-fitted to his civil service title.

PROMOTION EXAMINATIONS

A promotion examination for supervising nurse was held. Nurses of various years' experience in the department took the examination. Some nurses whose career in the department had not been too satisfactory made the supervisors' list, and had to be appointed supervisor when their turn came. Other nurses whose work and ability were of an outstanding nature, failed the examination. In this instance, the judgment of nursing supervisors who had worked long with the nurses, who knew their characteristics and abilities from actual experience, had to be cast aside in favor of a selection by written examination. In one sense this has seemed illogical and not in the best interests of the department.

An excellent stenographer in the department became more and more valuable as an administrative assistant. In consequence, the taking of dictation was assigned to others. This stenographer took a promotion examination to the next grade and failed because through lack of practice she could not take rapid dictation, this being a heavily weighted factor in the promotion examination.

A very proficient clerk stood part way down on a promotion list to the next grade. His responsibilities and performance were such as to entitle him to be raised in salary and promoted to the next grade. It was impossible, however, to raise his salary to the next grade until all on the list above him had had salary increases to the next grade level. The budget adjustments necessary to move all people up to the next grade added up to such a substantial sum as to prevent the individual in question from being advanced. In fact, he had to wait until salary increases for some less proficient and with lesser responsibilities were provided.

For certain titles, such as clerk, there are city-wide promotion examinations as well as department promotion examinations. In one city-wide examination Health Department clerks stood high on the list. When a vacancy for the higher grade occurred in another department, the Health Department clerks accepted the new position at a higher salary. The Health Department once lost 40 clerks in a mass exodus. The department lost the benefit of several years' experience of all these clerks and had to undergo all the attendant inconvenience in breaking in new clerks.

To fill these vacancies it was necessary to interview 400 clerks to secure 40 who would accept appointment. The others did not want a position in the Health Department because a rumor was abroad that advancement here was too slow.

In some of these implied criticisms of civil service, it should be said in all fairness that part of the difficulty was due to inability to secure budget changes.

ADVANTAGES OF ADMINISTRATION WITHOUT CIVIL SERVICE

Let us discuss this subject in its broader aspects. First, what would be the advantages of a free choice system of appointments, that is, without the restrictions of civil service?

The executive unhampered by civil service restrictions possesses this advantage. In deciding on appointments he has the opportunity of consulting competent individuals whom he personally knows and trusts. A recommendation from someone who has worked with a person, who has seen him perform, seen him under varying conditions of stress, who has seen how he "weathers" among his colleagues and with his subordinates, means a great deal in determining capability, probably more than a written or oral examination by examiners who do not have this knowledge.

Civil service, it is true, substitutes "what you know" for "whom you know." It is not altogether successful, however, in determining "how you do." It is a more difficult task to judge through available examination technics that intangible something called "administrative ability."

Some individuals stand up under the grind of an examination better than others. A qualified person with proven abilities, with commendable personal traits, may be surpassed in a written examination by one less able, though well informed and having a good memory. There is an outstanding instance in the New York City Health Department of a most competent person who after numerous promotion examinations has failed repeatedly because of examination jitters. Well merited salary increase could not be given because of failure to pass a promotion examination to the next higher grade. And yet there is not the slightest question about the individual's ability to do excellently the job assigned.

A free hand in managing a department gives a freer opportunity to weed out inefficient employees. Civil service or security in office affects some people adversely. In some it weakens ambition. This manifests itself in laziness or in an autocratic, overbearing attitude. The person does not keep up to date. He does the work assigned mechanically, but that is all. There is no interest. Initiative and originality have gone. He resigns himself to the inevitable; becomes sour and cynical. This attitude not only lessens his usefulness but brings disrepute on civil service employees in the eyes of the public and causes discontent among fellow employees.

An executive's position is made difficult. He may be fully aware of these circumstances. And yet it is hard to discharge an employee for loss of initiative or lack of interest. How can one present specific evidence of the time and place of loss of initiative? And yet to get rid of such an employee, charges must be specific.

A department under civil service then is inclined to go slow in weeding out the known, partially efficient personnel. This means that over the years a department may suffer from the accumulation of inefficient employees.

Of course, the question may be raised, is this the fault of civil service or is it due to over-cautiousness on the part of a department? Civil service

rules provide for an orderly means of dismissal. If a department believes that inefficiency exists, then it should secure the supporting evidence and proceed.

ADVANTAGES OF CIVIL SERVICE

Now let us look at the other side of the question.

The main advantage of civil service is that it relieves the Commissioner from all sorts of pressure and dictation as to appointments. With a sincere and capable Civil Service Commission—and the present Commission in New York City is of that calibre—qualified applicants are supplied to the department. The political leader is shorn of his power to dictate or even recommend. Not even the Mayor, if he were so inclined, can dictate what individual is to be appointed, and it is not only against the politician or the governmental superior that the Commissioner is protected. He is protected also against non-political, professional groups and individuals who with quite honest motives are manoeuvered into the backing of a particular and not necessarily incompetent candidate. Such groups and such individuals are capable of harboring grudges and initiating reprisals, as well as the out-and-out politician. Under civil service, however, the Commissioner cannot be blamed for not appointing a particular individual when he has no authority to do so.

Even under the free choice method, mistaken judgments and dissatisfactions have been known to occur. Sometimes the best and most trusted recommendations which fit a person in one environment do not hold good in another environment and in another type of position.

Then again, is the restriction under civil service any more stringent than under the free choice system? Is the free choice always as free as it is cracked up to be? Are there not claims of a political or social nature that force the hands of an executive just as much, if not more, than civil service regulations?

And, finally, the free choice system cannot always be assured of the best of intentions or the most ethical auspices under changing administrations. Are there not far more glaring instances of the appointment of incompetents under the free choice system than under civil service? There is nothing more demoralizing or debasing to a staff than to see an incompetent placed in a position of responsibility at a high salary through personal or political connections. In government is it not better in the long run to provide an appointment system that holds steady in fair weather and foul? The impersonal selection, in spite of some drawbacks, is better designed for the long pull.

Instances given above suggest that civil service in some instances tends to retard the advancement of competent people. Without civil service, however, there is opportunity to err on the other side by advancing certain favored people out of proportion to their abilities.

Under civil service the Commissioner is protected against dictation as to the discharge of a particular employee. He is free to discipline when it is deserved. Of course, his action cannot be capricious. There must be good ground for discharge and the Civil Service Commission and the courts are the watchdogs against discharge for unjustified cause. Civil service may cause an executive more effort in getting rid of inefficient employees, and yet, are the inefficient weeded out more promptly or more thoroughly under a free choice system? The opportunity to clean house exists, but is advantage taken of this opportunity? Are there not ties to influential friends of employees that make it just as difficult to discharge

people as the legal restrictions of civil service? Civil service must not be condemned unduly without knowing whether the dropping process is used more intelligently under one system than another.

As for the sagging of employee interest under the security of civil service, there is a remedy for this and that is a continuing program of staff education. This can be designed so as to rekindle the spark of dormant or dying interest and reëstablish a new and higher level of interest. This has been tried in the New York City Health Department and has been found effective. In most instances the light never burns so low but what it can be made to brighten under the proper stimulus. Long delayed salary recognition, where merited, is also essential as a restorative process.

Civil service protects the employee in his position against wholesale dismissals purely for political reasons at times of change in municipal administration. This means peace of mind and better morale within the staff, and likewise saves disruption of service.

In all this discussion civil service is being conceived as a bona fide institution as it was intended. In the hands of the unscrupulous, of course, irregularities are possible and the principal aims can be defeated. The public must be insistent that a high type of personnel be in charge and that all possible safeguards be provided to protect it against exploitation. Civil service in name only does not mean anything. It must be non-political and impartial in its actions.

SUMMARY

From the point of view of the New York City Health Department the advantages of civil service far outweigh the disadvantages. Qualified employees are being recruited for the department. The Civil Service Commission is alive to the shortcomings and is constantly striving to correct them. The Commission is anxious to provide good employees to all city departments. Examination methods are being steadily improved, and the product of the examinations is notably better each year.

So long as the health department is provided with a few exempt positions at the top to permit a commissioner to have at his side persons loyal to him and sympathetic with his policies, it is most advantageous to have the balance of the department under civil service. To counteract the tendency of employees letting down while basking in the security of their positions, a continuing program of staff education is necessary. The time has come when staff education must be recognized to be just as essential to good service as many bureau activities. Bureau directors should be held accountable for such service as a part of their administrative duties.

Civil service is a very democratic institution. Its principles fit in with our general governmental structure. Health department administration will be strengthened by its extension.

Coliform Bacteria and Streptococci in Swimming Pool Water*

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CALVERT,[1] in a brief review of the streptococcus test for water pollution, concludes: "There remains much work to do in respect to method of procedure as well as evaluation of results."

Recently the writers have had the opportunity to compare the streptococcus test with the coliform test in a college swimming pool. It is the object of this paper to report the results of that study.

The streptococcus test as first applied to water pollution was designed to show the presence of fecal streptococci. This is particularly true of the test as used in England. The test has not been recommended in this country as a standard procedure. The coliform test is accepted as a more accurate measure of intestinal pollution. When the streptococcus test was first applied to bathing places many investigators assumed that the organisms found were of intestinal origin. Some technicians and sanitarians still assume that. However, the studies made by Mallmann [2-7] certainly would seem to indicate that this is not true. In one of his studies, Mallmann [6] found that the streptococcus index in bathing places fluctuated with the bathing load, while this was not always true in the case of the coliform index. Mallmann felt then that the streptococcus index was a better measure of the pollution introduced by the bathers than the coliform index.

Calvert,[1] commenting on Mallmann's results showing that the coliform index in a chlorinated pool may be acceptable and yet streptococci be present, adds parenthetically: "This is at variance with a small amount of unpublished experimental work done on a chlorinated public supply where no streptococci were isolated from 50 ml. portions of water after passing the final point of chlorination."

The results given below will show that in the pool under test it was the exception rather than the rule to find coliform bacteria present, whereas streptococci were always present when bathers were in the pool.

METHODS

The pool used in this survey is of the recirculating type with a capacity of 110,000 gallons. Liquid chlorine is used as the germicidal agent, and the residual chlorine is kept at between 0.3 and 0.6 p.p.m. when the pool is in use. The manager of the pool holds a college degree in engineering so that the pool receives better than average care. Each bather is required to take a thorough bath, using plenty of soap, before entering the pool. At no time during this study was the pool overloaded with bathers.

The methods of procedure for demonstrating the presence of coliform

* Contribution No. 342.

bacteria and streptococci were those recommended in *Standard Methods of Water Analysis* (8th ed., 1936).

Samples were collected on at least 3 days of each week during the period of survey. The samples were collected according to the following daily schedule:

Sampling Period No.	*Time*	*Condition of Pool*
1	9:45 A.M.	Pool closed since 6:00 P.M. of previous evening.
2	10:20 A.M.	Pool open since 10:00 A.M.
3	11:30 A.M.	Pool in use since 10:00 A.M.
4	1:45 P.M.	Pool closed since 11:45 A.M.
5	2:20 P.M.	Pool open since 2:00 P.M.
6	3:30 P.M.	Pool open since 2:00 P.M.

Throughout the remainder of this report sampling periods will be referred to by the numbers given in the above schedule. Duplicate, and sometimes triplicate, samples were collected at each sampling period. One was taken from the deep end, one from the shallow end, and when a third sample was collected it was taken from the side and opposite the approximate center of the pool. Determinations for residual chlorine were made daily at each sampling period. At least once each day pH determinations were made. All sampling bottles contained sodium thiosulphate, and the elapsed time between the collection of the sample and its inoculation into the presumptive medium never exceeded 20 minutes. Five tubes of presumptive medium were inoculated with each sample of water.

RESULTS

Table 1 summarizes the results obtained in this study. In the case of the duplicate and triplicate samples, taken at each daily sampling period, the results were averaged and these figures considered as representing one sample. There are several interesting observations to be made from this table. The coliform bacteria were conspicuous by their absence, since positive presumptive tests were obtained from only three samples. Out of a total of 100 10 cc. inoculations (225 if the duplicate samples were considered separately), only 12 tubes were confirmed for the presence of coliform bacteria. On each occasion this occurred when the bathing load was heaviest, that is, the No. 6 sampling period.

Table 2 gives the results of a specific day when coliform organisms appeared. The bathing load was heavier than the average. In this table the duplicate samples have been considered separately, so that 10 tubes were inoculated from each portion of water. On this day, 3 of the 10 cc. portions showed the presence of coliform bacteria. In this case, as in the other 2 cases where coliform organisms appeared, they were present in only 1 of the 2 samples collected from the pool at that particular sampling period. At no time during this survey did these bacteria appear in

TABLE 1

Summary of Results

Sampling Period Number	*Total Number of Samples*	*Average Chlorine Residual p.p.m.*	*Average Number of Bathers*	*Total Number of Positive Lactose Broth Tubes*							
				Coliform Group				*Streptococci*			
				10 cc.	*1 cc.*	*0.1 cc.*	*0.01 cc.*	*10 cc.*	*1 cc.*	*0.1 cc.*	*0.01 cc.*
1	20	0.2	0	0	0	0	0	0	0	0	0
2	20	0.35	6	0	0	0	0	80	10	0	0
3	20	0.46	12	0	0	0	0	100	70	15	0
4	20	0.48	0	0	0	0	0	12	0	0	0
5	20	0.50	15	0	0	0	0	100	85	30	7
6	20	0.43	23	12	0	0	0	100	97	75	33

TABLE 2

Results Obtained on a Day When the Bathing Load Was Heavy

Sampling Period Number	Number of Bathers	Residual Chlorine p.p.m.	Number of Tubes Positive: Coliform Group 10 cc.	Coliform Group 1 cc.	Coliform Group 0.1 cc.	Coliform Group 0.01 cc.	Streptococci 10 cc.	Streptococci 1 cc.	Streptococci 0.1 cc.	Streptococci 0.01 cc.
1	0	0.2	0	0	0	0	0	0	0	0
2	8	0.3	0	0	0	0	9	5	0	0
3	15	0.5	0	0	0	0	10	6	1	0
4	0	0.5	0	0	0	0	3	0	0	0
5	17	0.5	0	0	0	0	10	7	1	0
6	35	0.4	3	0	0	0	10	10	6	3

less than 10 cc. portions of the water. According to the standards of Mallmann [7] the coliform index of this pool would have been acceptable and the pool classified as satisfactory.

Returning to Table 1 it will be observed that streptococci were always present in the water when bathers were using the pool. At the periods of the heaviest loads the organisms were found present in as little as 0.01 cc. of water. A small number of tests made, but not included in the tables, showed that when more than 50 bathers were using the pool streptococci could be found in 0.001 cc. of the water. These results confirm Mallmann's opinion [6] that the streptococcus index closely follows the bathing load.

According to Mallmann's standards [7] for streptococci, this pool would have been classified as unsatisfactory. Thus, we have the pool being classified as satisfactory by its coliform index and unsatisfactory by its streptococcus index. Which of these indices are we to accept?

To the writers the most interesting observations to be made from these results are the relatively high streptococcus index in proportion to the small numbers of bathers, and the rapidity with which these organisms appear after bathers have entered the pool. Table 3 shows the results obtained on a day when the bathing load was much lighter than the average. It will be noted that samples collected at the No. 2 sampling period showed the presence of streptococci in 7 of the 10 cc. portions and 1 of the 1 cc. portions. Yet there were only 5 bathers using the pool at the time, and the residual chlorine was 0.3 p.p.m. Also, these bathers were the first to enter the pool after it had stood overnight, and no streptococci had been found in 5 50 cc. portions of the water taken just before the opening of the pool. This seems a rather high streptococcus index in proportion to the number of bathers. It further indicates that these organisms must have come from a heavily contaminated source. Inasmuch as the streptococci were not present in large quantities of the water after the pool had stood overnight, we must eliminate the possibility of poor filtration or of chlorine-resistant strains. Since the appearance of the organisms follows so closely the entrance of the bathers into the pool it seems fair to assume that the bathers were introducing the bacteria. The samples of the No. 2 sampling period were taken within 10 to 15 minutes after the bathers had entered the pool. On some days as few as 3 bathers were in the pool when these samples were collected. Yet it was possible to find streptococci in 1 or more of the 10 cc. quantities examined. As to the streptococci being from intestinal sources, that can be eliminated because it would not be possible to have so many fecal streptococci present without finding some coliform bacteria. The writers are making a pure culture study of these organisms, and the results obtained at this writing indicate that they are not fecal streptococci.

TABLE 3

Results Obtained on a Day When the Bathing Load Was Light

Sampling Period Number	Number of Bathers	Residual Chlorine p.p.m.	Number of Tubes Positive: Coliform Group 10 cc.	1 cc.	0.1 cc.	0.01 cc.	Streptococci 10 cc.	1 cc.	0.1 cc.	0.01 cc.
1	0	0.2	0	0	0	0	0	0	0	0
2	5	0.3	0	0	0	0	7	1	0	0
3	8	0.5	0	0	0	0	9	4	0	0
4	0	0.6	0	0	0	0	2	0	0	0
5	10	0.55	0	0	0	0	10	6	1	0
6	18	0.5	0	0	0	0	10	9	3	0

Mallmann [8] in a personal communication states: "These organisms are not *Streptococcus fecalis* as they emanate from the mouth rather than from the intestine. We have carried on a series of experiments which have not been published as yet, definitely proving the source of these organisms." It is common knowledge that there occurs considerable flushing out of the nasal cavities and the mouth in swimming and diving. Also, many bathers add to this by gargling and expectorating.

In experiments now being conducted by the writers there is evidence to indicate that these organisms are also found on the body surface of the bathers before they enter the pool. This evidence will be published at a later date.

If these organisms are of oral origin then they must be given some sanitary consideration. If they are body surface saprophytes then it does not seem that they are of much sanitary significance.

From the results of this study it was found that these organisms are quite resistant to chlorine. Mallmann [4] has found that the streptococci in swimming pools are more resistant to chlorine than are the coliform bacteria. An attempt was made during the course of this survey to reduce the numbers of streptococci to a minimum, if not to eliminate them. When the residual chlorine content was raised to 0.6 p.p.m. their numbers were not materially decreased. When the residual chlorine was raised to 0.7 p.p.m. there was a noticeable reduction in their numbers, but there was also a noticeable reduction in the number of bathers. Numerous complaints were received of mucous membrane irritation, so that it was impossible to carry the experiment further at that time.

The writers expect in the course of experiments now under way to confirm the results of Mallmann that the source of these streptococci is the mouths of the bathers. It is possible that the organisms come from both the oral cavity and the body surface. Certain results obtained to date in a pure culture study of these streptococci indicate that they may not be true streptococci but micrococci which assume chain formation under certain biochemical conditions.

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Vapors and Their Routine Measurement*

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IN order that there may be no confusion between the subject of my paper and that of Mr. Patty on Gases,† I have assumed that "vapors" includes those substances existing in both the gaseous and liquid phase at ordinary atmospheric conditions. There will be some common substances, like HCl, which conceivably belong in either class. Thus, we find the solubility of HCl gas in water given in chemical handbooks; we buy the acid as an aqueous solution; yet it is a true gas. Similarly, H_2S is a gas, yet most accidents from H_2S result from its evolution from liquids in which it is dissolved. Under such conditions, the H_2S tension in the liquid is all important and we would surely then consider it as a vapor present in both the gaseous and liquid phases.

The most important hygienic risk from any poisonous substance is that which results from repeated exposures. Acute poisoning, as from CO, may be fatal, but it is accidental; it takes place at a definite time and place and rarely has a cumulative aspect. In industry, a catastrophe like benzol poisoning is caused by repeated exposures to concentrations of benzol in the air breathed. Such concentrations may not be in the least objectionable to the worker. This makes them all the harder to control, for both management and labor are very apt to belittle the danger or even to deny its existence until some unpleasant event like a fatal poisoning or an expensive damage suit awakens everyone.

The fundamental methods and principles by which the most important gases met in industrial hygiene practice can be determined have been reviewed by Mr. Patty. These methods all involve the taking of a comparatively small sample at a definite time and place, and from it determining the amount of the impurity in a certain air volume. Presumably, such samples are taken in order to get an idea of the fitness of the environment for the worker. A health risk, a reprimand by local or state health authority, or a damage suit, is in the mind of whoever orders the taking of the sample. Sometimes there is a fire risk from the contaminant, and once in a while valuable material is being lost. It is quite possible, then, that for routine sampling (not for sampling by the occasional investigator or inspector) we may accomplish our objectives better by installing equipment which will take continuous samples and record the results than by small grab samples taken every so often. It is this aspect which I propose to discuss.

THERMAL METHODS

Perhaps the best known gas recorder of hygienic interest is that for CO.[1]

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It depends upon the oxidation of CO to CO_2, a reaction which liberates enough heat to be measured by means of thermopyles and recorded on a recording potentiometer. The sensitivity of such a device depends upon the oxidizing catalyst and upon any interfering substances which may accompany the gas.

It is not necessary that the reaction or oxidation be complete, providing it takes place at a constant rate and always in the same fashion. That is, 10 parts per 10,000 of CO must always give off the same amount of heat, and the fact that only incomplete conversion of CO to CO_2 is secured is no drawback to the usefulness of the apparatus.

In the operation of the modern vehicular tunnel these recorders are just as essential as the ventilating fans. Their response to a heavy load on the ventilating equipment is rapid and reliable, but the results are purely empirical, so that the instruments must be calibrated from time to time against measured mixtures of air and CO.

Any gas or vapor which can be oxidized easily and uniformly can be adapted to recording in somewhat similar fashion. The explosion meters for gasoline vapors and for gases, such as methane, utilize this principle. If the presence of a flammable mixture of gasoline vapor and air can be indicated by the ringing of a bell or the setting off of a howler, it is a simple matter to make the indicator over into a recorder.

On paper these plans look easier than they prove to be in practice, for the final apparatus is apt to be cumbersome and complicated. The explosion meters and CO indicators now on the market are portable, which is a very desirable feature, but the recorders are bulky and must be set up with an eye to permanence.

The lower limit of vapor or gas concentration which can be recorded depends, of course, upon the magnitude of the heat of combustion of the substance in question. Thus, the modern CO recorder is not of much use below 1 part per 10,000. But the heat of combustion of CS_2 to SO_2 and CO_2 is about 5 times that of CO to CO_2, so that, volume for volume, it should be possible to record CS_2 by a thermal method in concentrations one-fifth of those for CO, or about 20 p.p.m. Unfortunately, this is not low enough for hygienic purposes, so that it is unlikely that CS_2 recorders based upon these ideas will be developed. What the lower limits would be for the recording of any gas or vapor by this thermal method depends upon the physicochemical properties of the mixture.

VAPOR-TENSION METHODS

There have appeared recently [2] new condensation methods adapted to determination of substances which are non-miscible with water and which have appreciable vapor tensions under ordinary conditions. Burrell and Jones [3] were the first to make use of this idea, but their equipment was designed to determine concentrations of vapors, like gasoline, which offered a fire risk—they dealt, therefore, with concentrations measured in per cent, and not in parts per million. It is doubtful if it would be practicable to adapt any of these methods to continuous or even to intermittent recording, so I shall not discuss them further.

COLORIMETRIC METHODS

Automatic color analyzing has been a practical entity for some time in many plant problems but the principles have been little used in gas analyses. Stackhouse and Chaney [4] have developed a colorimetric recorder for low percentages of N_2O_4 and of H_2S as met in the manufactured gas industry. The gas is bubbled slowly through a suitable absorbent and the magnitude of a color

change produced by a chemical reaction is measured photoelectrically and recorded, as by a recording potentiometer.

These recorders are in actual use in gas plants and much of the set-up could undoubtedly be adapted to the determination of other gases. For both N_2O_4 and H_2S, the sensitivity is adapted to the range below 10 p.p.m. which, for these gases, makes the instruments of special interest in occupational disease problems.

The selenium sulfide mercury recorder [5] of the General Electric Company is a good example of an instrument adapted to the control of vapor concentrations by colorimetric recording. The darkening of selenium sulfide paper by mercury vapor is a very sensitive reaction and the instrument seems to have proved useful in practice.

Owens's recorder for the soot and smoke of city air is well known in Britain and in this country. A disc of filter paper is marked off in fractions of 24 hours and rotated by a clock. At intervals, the paper stops and air is then drawn through at controlled rates making a dark spot about $\frac{1}{8}$" in diameter. A series of such spots are made for known concentrations and the unknowns are then matched against the knowns. Obviously, many chemical reactions can be adapted to utilize the Owens's apparatus and thus be recorded.

The lead acetate paper test of H_2S giving the dark PbS color is about as old as quantitative chemical analyses. A $PbAc_2$ paper recorder for H_2S in concentrations as low as 1 p.p.m. has been described by Reed,[6] while another made by Bushnell [7] is claimed to be satisfactory for use in the oil industry. Reece and Drinker [8] have developed such a recorder for use in rayon plants * where H_2S concentrations in the spinning rooms may be something of a problem. In the latter device, the color of PbAc paper before and after gas has passed through is compared photoelectrically and the differences in darkness are recorded.

In our experience, one of the chief difficulties in making an apparatus adapted to plant use was the obtaining of a paper of uniform density. Without such paper, the degree of darkening from PbS was irregular.

CONDUCTIVITY METHODS

One of the most serious pollution problems we have in this country is from SO_2 which is, of course, a true gas and not a vapor. It may, however, carry with it some SO_3 as an aqueous mist. Concentrations greater than about 1 p.p.m. affect vegetation and are, therefore, the direct concern of us all.

Sulfur dioxide is determined in small amounts by iodometric methods. It is recorded, however, by a method based on entirely different principles. The air in question is passed into acidified H_2O_2 and the SO_2 thereby oxidized by SO_3. The SO_3 is then absorbed and the change in conductivity is recorded by means of a conductivity meter. The apparatus to which I refer was developed by Thomas [9] at Salt Lake City in connection with pollution studies in the vicinity of sulfide roasters.

In estimating sulfur vapors or gases in the air of factories or mines, Thomas's meter can be adapted directly to any in which the gas can be burned to SO_2, under constant conditions. Again, in the rayon industry, we have just such a problem, for we wish to record CS_2 vapor in concentrations ranging down to less than 1 p.p.m.

It has been shown by Thomas [10] that his meter can be adapted to the measurement of CO_2. For this, he uses NaOH as the solvent. Walter [11] states that conductivity methods have been

* Of the American Viscose Corp., Wilmington, Dela.

adapted to the recording of H_2S in $Pb(OAc)_2$, SO_2 in $K_2Cr_2O_7$, NH_3 in H_2O or dilute H_2SO_4, O_2 in potassium pyrogallate, C_2H_2 and CO in ammoniacal Cu_2Cl_2, N oxides in $FeSO_4$, Cl and Br in H_2O or alkaline H_2O_2 and SCl_2 in KOH.

The benzol vapor indicators, at present available, are of dubious accuracy below about 200 p.p.m., although more is claimed for them. They depend upon measuring the heat evolved by burning the vapor. Thomas's conductivity meter is probably of sufficient sensitivity to be used for measuring the increase in CO_2 formed by the burning of very low concentrations of any hydrocarbon vapor or of a true gas, like methane. At present, benzol must be determined by purely chemical methods which, although serviceable, are not adapted to conversion into a recording apparatus.

Other hydrocarbon vapors, like those from gasoline, from various esters, such as amyl acetate, from numerous ketones and aldehydes, are met from time to time in field work, but they are apt to be ignored, as they rarely are of concern, except as fire risks. In low concentrations they are difficult to detect by any quick test, but all of them form definite amounts of CO_2 when burned and, therefore, lend themselves to the possibility of recording by the Thomas apparatus.

In like manner, it should be practicable to adapt conductivity methods to the recording of chlorinated hydrocarbon vapors, like those from CCl_4. The field method for their determination depends upon conversion of the vapor to HCl, absorption of the HCl in dilute sodium carbonate, and titration of the chloride ion. The determination and recording of either HCl or CO_2 by conductivity methods has already been accomplished and is well within the sensitivity range demanded in hygienic problems.

ABSORPTION OF RADIANT ENERGY

If light of certain wave lengths is passed through air containing a vapor, such as that of mercury, the light is filtered out in approximate proportion to the concentration of the vapor present. This fact is utilized in the photoelectric mercury detector developed also by the General Electric Company.[5]

More recently, the R. & H. Chemicals Division of Du Pont's have used this principle in the detection of trichlorethylene. Results are indicated upon a milliammeter, so that it should not be a great step to adapt the instrument to recording instead of indicating. Hansen, of Du Pont, suggests that the instrument can be adapted to the detection of vapors as shown in Table 1.

TABLE 1

Vapor	*Sensitivity p.p.m. of Air per Scale Division*
a. Mercury	0.0001 approximate
b. Perchlorethylene	0.5
c. Toluol	1.0
d. Diphenyl	1.0
e. Benzol	1.2
f. Phosgene	5.0
g. Acetone	5.0
h. Pentachlorethane	7.0
i. Trichlorethylene	10.0
j. Carbon disulfide	12.0
k. Gasoline (Blue Sunoco)	50.0

The instrument in its present form is insensitive to the following vapors in air: methylene chloride, carbon tetrachloride, ethylene dichloride, tetrachlorethane, chloroform, methyl chloride, methanol, ethanol, ethyl acetate, water vapor.

The recording of smoke density by determining the amount of visible light which is either (a) obstructed, or (b) passed through a definite distance, is fairly common practice and has been in use in power plant smoke recording for some years. Hygroscopic neuclii, as from SO_3, easily form dense fogs, the opaqueness of which to visible light can be determined photoelectrically or visually. Long [12] uses this method to detect completeness of SO_3 absorption

in the effluent gas from a contact sulfuric acid plant.

This method has been adapted by Kay [13] to the recording of CS_2 in the churn rooms of viscose-rayon plants.* Air containing CS_2 vapor is passed over heated platinum foil which oxidizes it to SO_2 and CO_2. The exit gases are then passed through a second furnace containing again platinum foil but heated to a lower temperature. In the second furnace, the SO_2 is converted to SO_3. Visible fog is then formed by passing the warm air containing SO_3 over water. The density of the fog is then measured by means of a photronic cell.

The sensitivity of this method, while fairly good, may not be enough for practical use in the rayon plants for which it was originally designed. It happens that the CS_2 control has been brought down to amounts substantially below which we had intended the apparatus originally to measure. It seems to work well, however, in the region of 10–30 p.p.m. and is sensitive to changes of about 2 p.p.m.

COMMENTS

None of these recorders is cheap. The Thomas SO_2 meter costs about $1,200, while Stackhouse's N_2O_4 and H_2S apparatus costs even more. The CO recorder sells for well over $1,500, and we fear that the equipment we have devised for CS_2 and for H_2S will cost over $1,000. There is a slight amount of servicing required for all this apparatus and check-ups against known concentrations from time to time are essential. Against these costs must be balanced the value of continuous records and the releasing of the technician who formerly took the samples. We doubt very much whether they are adapted to use by industrial hygiene laboratories of states or insurance companies. They are, however, well worth considering by firms who have a definite pollution problem, the extent of which they wish to record.

* American Viscose Corp.

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Effects of Vitamin C Intake upon the Degree of Tooth Injury Produced by Diphtheria Toxin*

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THE close relationship of vitamin C intake to the development and maintenance of sound teeth in guinea pigs, monkeys, and men has been recognized for many years.[1, 2, 3] The essentially new features of the present investigation, supplementing an earlier report from our laboratory refer to: (a) the degree of tooth injury that can be caused by diphtheria toxin, and (b) the importance of a high vitamin C intake for protection against such injury.

It has been established recently in a number of laboratories that guinea pigs in "the prescorbutic state" (McCollum)—partially depleted of their vitamin C reserves—are more sensitive to injury by bacterial toxins than are well nourished animals. Analysis of the tissues after an injection of toxin shows further that the toxin causes a marked loss of the vitamin from many of the tissues within 24 to 48 hours.[4] The latter point, too, has been verified in a number of laboratories. Several authors have reported losses ranging from 30 to 50 per cent of the vitamin C (ascorbic acid) content of tissues following sublethal injections of the toxin. A few investigators have reported evidence that pointed toward a *direct* detoxifying action by neutral solutions of the vitamin, both *in vitro* and *in vivo*, but our studies have not given support for such a viewpoint. We believe that the detoxifying action of the vitamin on such complex materials as bacterial toxins *in vivo* is not due simply to a direct chemical reaction between ascorbic acid and the toxin.[5] Although a nonspecific acid denaturization of the toxin could be demonstrated readily, we could find no evidence for a specific detoxification reaction *in vitro*.

An interesting clinical report by Dr. Macy and her associates[6] during the past year showed that children receiving a marginal intake of vitamin C were especially sensitive to the development of scurvy during periods of infection. Without increasing the vitamin C intake, recovery from mild scurvy followed spontaneously after the period of infection. Additional recent papers provide evidence in support of the viewpoint that ascorbic acid is related to the processes of detoxification both in

* A summary of the present report was presented before the Food and Nutrition Section of the American Public Health Association at the Sixty-eighth Annual Meeting in Pittsburgh, Pa., October 20, 1939.

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the human body [7] and in experimental animals. In all, there is considerable evidence to indicate that the experimental work with guinea pigs reported in the present paper and in an earlier report [8] is pertinent to the problem of good tooth development in children. Recent surveys in England appear to have a close bearing on our studies, in that good nutrition and freedom from disease during infancy and childhood were the factors most closely related to freedom from dental caries [9] at the age of 10 to 14 years.

EXPERIMENTAL

Guinea pigs placed in individual raised-bottom cages when approximately 250 gm. in weight were given a standard diet [1] of rolled oats, wheat bran, yeast, butter fat, heated skimmed milk powder, and salt, supplemented by cod liver oil twice per week. Fresh spinach was fed daily until they were about 300 gm. in weight. The spinach supplement was then discontinued and pure ascorbic acid solution was given daily by pipette during the remainder of the experiment. Animals that did not show a normal growth rate were discarded. When the average weight of the animals reached approximately 350 gm., toxin injections were made intraperitoneally.

At intervals of 3, 10, and 30 days following the toxin injection * two or more animals were taken from each group for examination of the teeth, to provide an indication of the course of injury and repair.

The vitamin feeding levels were selected on the following basis: The 0.8 mg. per day intake is adequate for normal growth [10] and is slightly more than is needed for protection from external or gross symptoms of scurvy through a long interval of time. The tooth structure is not quite normal at this level, but the disturbance due to vitamin C deficiency alone is not severe. It is a sensitive zone where tooth injury due to the added factor of toxin injection can be clearly demonstrated, yet it is analogous to a state of nutrition that is apparently common in human experience. Recent papers by Boyle, Bessey, and Wolbach [11] place special emphasis upon the production of diffuse alveolar bone atrophy, both clinically and in guinea pigs, by moderate, chronic vitamin C deficiency.

The 5.0 mg. per day level is comparable to a high vitamin C intake clinically (approximately 10 times the minimum quantity that will protect against the obvious symptoms of scurvy through a period of several weeks), and might be considered analogous to a human intake of 150 to 250 mg. per day, depending upon size and age. The 5.0 mg. level is approximately 3 times higher than the level required for normal tooth development in guinea pigs when they are not subjected to infections or other unusual stresses. Such benefit as might accrue from a good state of nutrition in contrast to a marginal state of nutrition should be evident from studies with the above two levels.

DISCUSSION

The injuries to tooth structure that are related to diphtheria toxin and vitamin C, as illustrated by the accompanying photomicrographs, involve primarily the dentin and dentin forming cells, the odontoblasts. In view of the fact that the same tissues are very sensitive to vitamin C deficiency alone, and, further, that the toxin causes a marked loss of vitamin C from the body as a whole, the injury that has been observed consistently after toxin injections may be due primarily to an increased severity of vitamin deficiency. The frequency of tooth fracture on the

* When two injections were made, the first was made 3 days prior to the second, and the stated time interval was subsequent to the second injection.

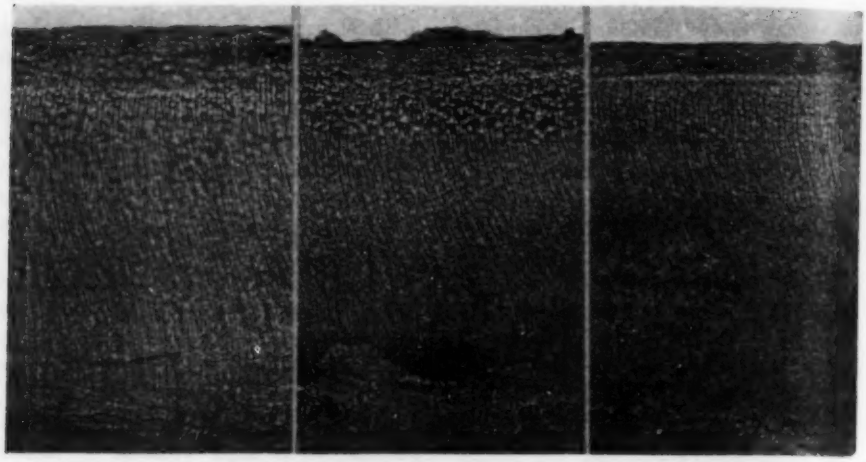

FIGURE 1—Photomicrographs * of thin-ground sections, showing the lingual side of guinea pig incisors, about midway along the length of the tooth. (a) Vitamin level, 5 mg. per day for 30 days; no toxin injections. (b) Vitamin level, 5 mg. per day; toxin injection, 0.4 m.l.d.; time elapsed after injection, 30 days. (c) Vitamin level 5 mg. per day; 30 days after receiving 0.8 m.l.d. of toxin. The tooth structures are essentially normal in each case.

* The authors are indebted to Mr. Reinhardt Rosenberg for his assistance in the preparation of photomicrographs.

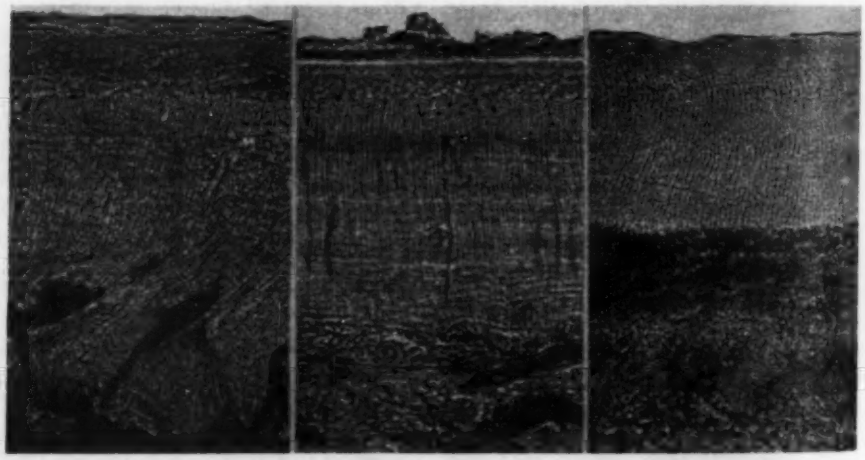

FIGURE 2—Preparation of sections and tooth areas similar to those shown in Figure 1. (a) Vitamin level, 0.8 mg. per day; 30 days after receiving 0.4 m.l.d. of toxin. (b) Vitamin level, 0.8 mg. per day for 30 days; no toxin. (c) No vitamin C supplied during a 20 day test period; no toxin (uncomplicated severe scurvy).

low nutritional level subsequent to toxin injections, together with the histological record of increased injury to the odontoblasts and dentin, affords evidence of the benefit to be derived from a vitamin C intake that is above the minimum requirement for normal growth and superficially apparent health.

SUMMARY

Guinea pigs receiving 5.0 mg. of ascorbic acid per day did not show

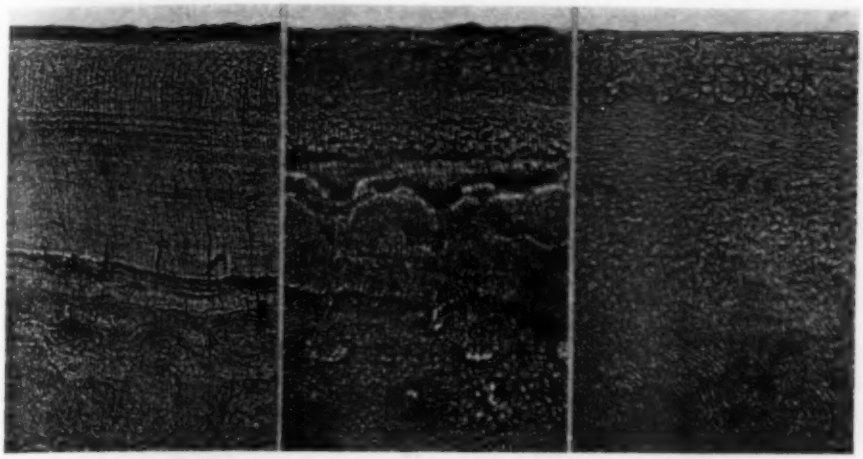

FIGURE 3—Preparation of sections and tooth areas similar to those shown in Figure 1. (a) Vitamin level, 0.5 mg. per day for 10 days; no toxin (mild uncomplicated vitamin C deficiency). (b) Vitamin level, 0.8 mg. per day; 10 days after receiving 0.8 m.l.d. of diphtheria toxin. (c) Vitamin level 0.8 mg. per day, 10 days after receiving 0.4 m.l.d. of toxin.

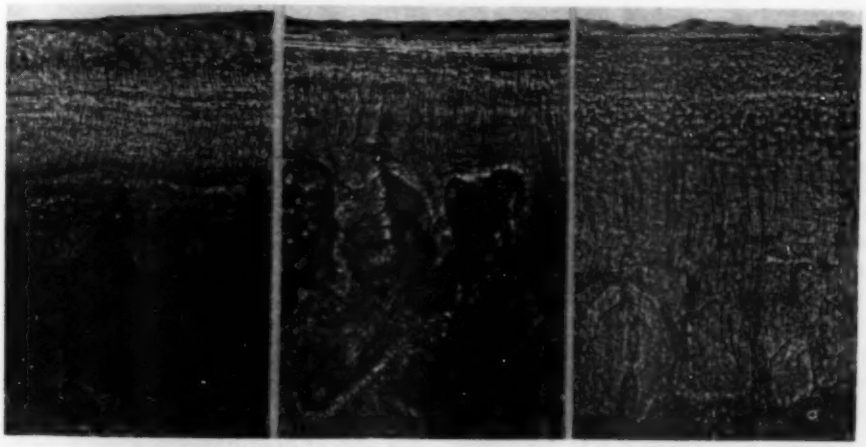

FIGURE 4—Preparation of sections and tooth areas similar to those shown in Figure 1, except that (a) and (b) represent areas nearer the root tip where there has been less opportunity for the development of dentin. (a) Vitamin level 0.8 mg. per day; 3 days after receiving 0.8 m.l.d. of toxin, showing distinct injury to the pulp and odontoblasts. (b) Vitamin level 0.8 mg. per day; 3 days after receiving 0.4 m.l.d. of toxin. Severe injury to the odontoblasts and pulp is evident. (c) Vitamin level 0.8 mg. per day; 30 days after receiving 0.8 m.l.d. of toxin. Marked injury followed by very incomplete recovery or repair.

gross or histological evidence of injury to the teeth when diphtheria toxin was injected intraperitoneally in dosages of 0.4 or 0.8 m.l.d. Comparable animals that received 0.8 mg. per day of ascorbic acid without toxin injections grew at a normal rate and showed only slight histological evidence of vitamin C deficiency during the experimental period. Injections of 0.4 or 0.8 m.l.d. of diphtheria toxin resulted in marked injury to the odontoblasts and dentin in the

TABLE 1

General Plan of Experiment, Illustrating the Relation of Vitamin C Intake to the Degree of Tooth Injury Caused by Diphtheria Toxin in Guinea Pigs

Group	Vitamin Intake per Day [1] mg.	Toxin Dosage [2] m.l.d.	Time Elapsed After Treatment Days	Condition of Teeth
1	5.0	0	30	Normal
2	5.0	0.4	3	"
3	5.0	0.4	10	"
4	5.0	0.4	30	"
5	5.0	0.8	3	"
6	5.0	0.8	10	"
7	5.0	0.8	30	"
8	0.8	0	30	Evidence of chronic deficiency in odontoblasts and dentin
9	0.8	0.4	3	Distinct evidence of injury to the odontoblasts and dentin
10	0.8	0.4	10	" " " " " "
11	0.8	0.4	30	" " " " " "
12	0.8	0.8	3	Severe injury to the odontoblasts and dentin, some injury in pulp
13	0.8	0.8	10	" " " " "
14	0.8	0.8	30	" " " " "
15	0	0	10	Typical moderate changes in the odontoblasts and dentin
16	0	0	20	Typical extreme changes in the odontoblasts and dentin
17	0.5	0	10	Typical moderate changes in the odontoblasts and dentin
18	0.5	0	20	Typical marked changes in the odontoblasts and dentin

[1] Fed by pipette as ascorbic acid solution, supplementing the standard Sherman diet: rolled oats and wheat bran, heated skim milk powder, butter fat, yeast, salt, and a vitamin A & D supplement.
[2] Single intraperitoneal injections of 0.4 m.l.d. each, or two such injections 3 days apart.

teeth of animals receiving only 0.8 mg. per day of ascorbic acid. The need for maintaining a vitamin C intake above that required for normal growth and external evidence of adequate nutrition is clearly indicated.

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Utilization of Available Resources in the Control of Tuberculosis*

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IT is unfortunate for the human race that excruciating pain is not a predominant symptom in tuberculous infection and disease and that the development of clinical symptoms is so insidious instead of being the sensational type that leaves mute and unmistakable evidence of its attack or that brings quick certain death once the infection has become active. The presence of rabies, even in animals, causes an immediate and insistent public demand that drastic control measures be instituted because clinical rabies means indescribable suffering and certain death; poliomyelitis kills or cripples to the extent that the public also fears this disease and its after effects. If pain, crippling, and sudden death were the rule in early tuberculosis it would be a matter of perhaps not more than two generations until tuberculosis would become practically nonexistent.

Hippocrates stated centuries ago that the consumptive comes from the consumptive. Koch announced some twenty centuries later—in 1882 to be exact—that the tubercle bacillus was the specific cause of tuberculosis. It is an accepted fact that infection and, in turn, tuberculous disease result from exposure to the active open case of tuberculosis even though there are still many "dead ends" in our knowledge of the epidemiology of tuberculosis. The infection or disease status of the individual can be determined by simple and relatively inexpensive diagnostic procedures. There are accepted and reasonably effective methods for the prevention and cure of tuberculosis. Yet despite the knowledge of accepted principles and facts in the prevention, diagnosis, and cure of tuberculosis, the average person takes little or no cognizance of the seriousness of the situation until the stricken individual becomes incapacitated and has sown a fertile plant-bed for future cases among his immediate household and close associates. Instead of taking too many things for granted and doing little or nothing about most of them, as has been done in the past, except as they may come within our fields of particular interest, we must strive to bring together all available and potential resources into a well planned, continuous and concentrated program for the control of a disease that should be reduced to a minimum in two generations.

An effective tuberculosis control program must not only provide for the finding and care of the individual patient, but must give particular attention to measures for family and community protection. *Prevention at the source* must be the first objective and is attainable only if we control the infective agent at its source, the human body. All groups directly or indirectly con-

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cerned with the promotion of the control service must be brought into the picture. Where should we begin? Hippocrates gave us the answer to this question centuries ago. Koch confirmed it a little more than a half-century ago. It was not until well after the turn of the present century that any marked effort was made uniformly to collect, study, and use specific data on tuberculosis in planning control programs. We should begin immediately to use available morbidity and mortality data on tuberculosis as the basis for planning the case finding, case care, and case prevention service. All groups —general and special public health staffs, private physicians, general and special hospitals, teacher training schools, official appropriating bodies, school teachers, farm and home demonstration agents, welfare workers, etc.— have and should assume certain direct or indirect responsibilities in the control of tuberculosis.

The local *health department* staff has access to all homes and direct contact with all groups concerned directly or indirectly with tuberculosis control, hence the local *health officer* is the logical person to act as local coördinator of the case finding, case prevention, and case care activities of his official jurisdiction. Much improvement can and must be made in the collection and use of morbidity and mortality statistics data by local staffs. Where there is no local health department the state staff must be prepared to promote the program.

The private physician must be encouraged to give more attention to the diagnosis and care of early tuberculosis. The family of the tuberculous case must be treated as a case unit. The value of tuberculin testing infants and very young children routinely in families where there is a known or suspected case of tuberculosis should be stressed. A positive tuberculin test in an infant should be regarded as a serious indication for the child and fairly conclusive evidence that there is a sputum-positive case among the household or close contacts. A negative tuberculin does not necessarily indicate absence of active tuberculosis in a given household. Diagnostic assistance must be made available to private physicians for the cases that are unable of themselves to provide it. Collapse therapy offers much hope for carefully selected cases but should be used only by those who know the technics and contraindications as well as indications for each. Money spent in training private practitioners in the diagnosis and management of tuberculosis will be a good investment. We must consider not only plans for stimulating more interest in tuberculosis control among those not now interested but make an immediate effort to improve the work of those now doing some special work in this field.

Consideration of the possible uses of general and special hospital facilities provokes interesting points of view and should be preceded by an inventory and study of existing facilities. The general and special hospitals have a definite place in the control program. Most surveys reveal that there are many unused beds in the general hospitals; also, that there is much prejudice among general hospital administrators about admitting tuberculosis cases, as such, to these institutions. All agree that the general hospitals should not be used for strictly custodial care of tuberculous patients, but since tuberculous patients are admitted for all other types of service there is no plausible excuse for refusing admission when the case requires only a short period of hospital care for the institution of some form of collapse therapy. This program is worthy of a careful trial even where special hospital facilities are available and particularly where the limited number of beds in the special institutions

and transportation considerations restrict institutional service largely to the group requiring an extended period of hospitalization.

A practical point of consideration is the difficulty of getting the incipient, ambulatory case to agree to go to the sanatorium. As a rule he will agree to go to the general hospital much earlier than to the sanatorium. Pneumothorax affords a cause for some optimism in the well planned control program and particularly so where cases are found early. However, it must not be considered as the final solution to our problem. It can be made a valuable aid if properly utilized. It will do more harm than good in the hands of untrained men.

The responsibility for providing funds for tuberculosis control lies with the official state and local appropriating bodies since funds from philanthropic and voluntary agencies are not sufficient to meet local needs for a limited and sustained program. Economic as well as humanitarian considerations must be brought into the picture. It can be shown that failure to provide facilities for the detection, care, and prevention of tuberculosis results in an unnecessary loss of earning capacity usually at the most productive period of the individual's life. It is exceedingly costly to care for these unfortunates and their families while the wage earner is incapacitated, and to bury some of them after they are dead. The public is paying far more in loss of earning capacity and in dependency claims incident to tuberculosis alone than the entire appropriation for all public health services. The wise expenditure of public funds for tuberculosis control is a sound investment in the future well-being of the human race.

Our teacher-training institutions have been prone to teach health in an academic sort of way with comparatively little attention being given to the development of methods or materials for practical health teaching. Let's quit studying blueprints of the human body and devote the time to studies of the development and maintenance needs and protection of the machine. The teaching of the basic principles of healthful living must be incorporated in the elementary school curricula, particularly in the lower grade levels. Time and money can be wisely spent in improving methods and facilities for sound health teaching in this group. They must be prepared for the critical period that is ahead. Beginning with the high school age group, specific instruction in the preventable diseases can be integrated with instruction in the general sciences, home economics, history, etc. There is probably no single group where a tuberculosis educational program would be more effective than in the high school age group. It is an ideal group in which to use the tuberculin test and x-ray of positive reactors as a sort of follow-up to the preliminary program of subjective teaching because they are just reaching the age where tuberculosis will become an increasingly serious problem. The state and local health and education officials cannot afford to ignore the possibilities of well planned general and specific health educational programs as a component part of the school curricula.

Reports by welfare agencies reveal that tuberculosis is a major cause of dependency as a result of death or incapacitation of the family bread winner. Proper food is one of the most important elements in tuberculosis control. Many of these families have facilities for producing more foodstuffs for home consumption but lack knowledge of what is needed and methods of preservation. The services of farm and home demonstration agents have never been specifically utilized but should be used to good advantage in planning the pro-

duction, preparation, and preservation of essential foodstuff in many of these families. If one is inclined to give this particular possibility a second thought, there are many things that should cause us to feel that a good bet has been consistently overlooked in the past.

There are promotional and field services that must be sponsored at the state and local levels by the official public health agencies. In areas without full-time health service the state health department must assume some responsibility for guiding the local programs. The state department should take the initiative in the bringing together and utilization of the resources of all agencies, state and local, in the most effective way. Their proper utilization is directly dependent upon the ability of state and local health personnel to develop teamwork among all groups. The state departments of health and education must work together in planning the content and use of teaching material in the schools throughout the state if we are successfully to combat the existing false belief among the people that tuberculosis is a hereditary disease with a hopeless outlook.

Briefly, what can be done and how?

1. The records of the sick and recent dead can be used as the starting point of an intensive early case finding service. Their families must be studied as a unit. There is good cause to believe that a biennial survey of the high school group will reveal a sufficient number of active tuberculosis cases to justify the time and expense involved in the survey to say nothing of the practical educational possibilities.

2. Diagnostic assistance—clinical and x-ray service—should be made readily available to practising physicians and local health departments. Local health officers must be taught to conduct their own screen clinics, utilizing local facilities, if any, instead of depending upon the state agency to do all the diagnostic work for them.

3. Positive cases, particularly the incipient case and sputum positive case, should be brought under medical supervision as soon as found. If treatment is to be carried out in the home, intelligent nursing follow-up service is essential for protection of the family contacts and to a degree for the care of the patient. It is of sufficient importance to state again that all household contacts of active cases and certain types of healed cases should be carefully examined periodically.

4. Special facilities and financial provisions should be made available for training private physicians interested in the control of tuberculosis. Scholarships for well planned courses of training will do much to stimulate more active interest among physicians. Clinical consultant services are as indispensable to a successful program as well trained local physicians.

5. Facilities must be made available in general and special hospitals as indicated for the care of cases requiring special treatment. There is no evidence that the facilities of all general hospitals have been fully utilized as yet.

6. Health and welfare agencies should set up facilities for coöperative planning for the care of cases eligible for any type of public assistance. It is improbable that much can be done about the permanent relief of economic distress; however, lasting benefits will come from teaching people how to live.

7. *Education* is the capstone of the entire program. The extent to which we are able to get the individual citizen, lay and professional and educational groups attuned to an understanding of the problem and its solution, will be the yardstick for measuring permanent accomplishments. Our main hope lies in teaching the younger generation to do and think for themselves and pass their knowledge on to succeeding generations.

Longevity of Eberthella Typhosus in Various Soils*

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WITH increasing congestion of population, the steady decrease in unpolluted water supply sources, and with a growing tendency to reclaim polluted waters from sewage plants, and to use more or less completely purified sewage for irrigation, the longevity of intestinal pathogens becomes a question of growing concern.

The present studies report the results of investigations carried on at intervals during the past 4 years upon the length of time that *Eberthella typhosus* is able to maintain itself in soil subjected as closely as possible to conditions approximating those prevailing in nature.

This subject has been a matter of interest almost from the time of Eberth's original report of the causal organism of typhoid fever.

Grancher and Deschamps [1] in 1889 claim to have recovered it from soil after 5½ months. Karlinski [2] in the same year reported a 3 months' survival in natural soil. Dempster [3] reported survivals of from 12 to 42 days in various types of soil. Pfuhl found a survival of 28 days in dry soil and 88 days in moist.

Robertson [4] added bouillon cultures to unsterilized soil and claimed to have isolated the organisms after 315 days and from natural soil after 86 days. Martin's [5] data indicated a possible survival of 404 days. Death was more rapid in sterilized soil. In pure peat soil the organisms could not be recovered after 24 hours. Firth and Horrocks [6] found that laboratory and freshly isolated strains survived 55 and 32 days, respectively, in unsterilized soil.

Rullmann [7] recovered viable organisms from organically polluted soils after 100 days when the soil was unsterilized and after 16 months in similar sterilized soil.

Sedgwick and Winslow [8] reported over 99 per cent destruction in dry soil in 2 weeks with a longer survival in moist soil. Smith [9] believed *Eberthella typhosus* would live only a short time in unsterilized soil and a little longer in sterile. Mair [10] reported to the contrary claiming survivals of 42 and 74 days in unsterilized and 9 days in sterile soil. Kligler [11] in perhaps the best organized and most exhaustive series of experiments of all reported survivals of 80 days under certain conditions. His experiments, however, appear to have been carried out under controlled rather than under natural conditions.

On one point the investigators are in accord, that moisture plays an important rôle. With the exception of Kligler's work it is difficult to evaluate

* Read before the Laboratory Section of the American Public Health Association at the Sixty-eighth Annual Meeting in Pittsburgh, Pa., October 20, 1939.

TABLE 1

Eberthella Typhosus per Gram Soil

Rainy Season 3.2 Inches of Rain

Soil	Initial	1 Day	2 Days	7 Days	14 Days	21 Days	28 Days	35 Days	42 Days	49 Days
Adobe	16,000,000	12,000,000	8,200,000	1,000,000	80,000	22,000	3,000	650	40	0
Adobe peat	15,000,000	10,000,000	9,500,000	2,000,000	200,000	50,000	7,000	800	250	0
Loam	16,000,000	11,500,000	9,000,000	3,500,000	600,000	75,000	10,000	950	300	95
Sand	22,000,000	5,000,000	50,000	10	0	0	0	0	0	0
Peat	14,000,000	100	0	0	0	0	0	0	0	0

Dry Season 2.0 Inches of Rain

Soil	Initial	1 Day	2 Days	7 Days	14 Days	21 Days	28 Days
Adobe	25,000,000	11,950,000	7,000,000	800,000	50,000	10	
Adobe peat	23,000,000	11,500,000	8,000,000	900,000	75,000	10,000	50
Loam	23,000,000	11,650,000	7,500,000	500,000	10,000	75	
Sand	20,000,000	1,000,000	1,100				
Peat	26,000,000	25	0				

much of the earlier work. Technics in many cases were still comparatively new and crude and the conditions of the experiments have not always been clearly discernible.

The observations reported in this paper constitute part of a program of studies on the longevity of typhoid organism exposed to a variety of natural conditions. Survivals in sea water and in sewage have been previously reported.[12, 13]

The data that follow are derived from our attempts to gain an approximation at least of the length of time massive inocula of typhoid organisms would survive in four types of soil during rainy seasons and during seasons practically free from rain, together with certain other related factors.

Adobe, adobe-peat-moss mixture garden loam, sand and straight peat moss were first investigated. Portions of the soil were placed in unglazed clay flower pots suspended over containers of 5 per cent lysol and placed out of doors in such a position that they were exposed to rains at any time and to sun about two-thirds of the day. Initially the soils were adjusted to approximately the same moisture content (20 per cent) and inoculated with saline suspensions from 24 hour agar slants. The organisms were distributed as evenly as possible through the upper 4 inch stratum. At intervals, 5 gm. of soil were removed, shaken up in 95 cc. of saline filtered and the organisms per gm. of soil determined.

In investigations of this nature we have found the Wilson-Blair bismuth sulfite [14] agar to be of great assistance, since *Eberthella typhosus* stands out as a startling jet black colony and the majority of other types are inhibited or eliminated altogether. Counts of typhi on this medium and plain agar are comparable. Originally, we prepared our own media with which at times we had difficulty, but in the present studies the Digestive Ferments Company * dehydrated product was used and found to be entirely satisfactory.

Equal weights of the various soil types were held at a constant temperature of 20° C. for 48 hours to observe the rate at which moisture was lost. All soils were then adjusted to approximately the same initial moisture content. There was probably some error in the results due to differences in volume and area. This would be more noticeable in case of the peat which oc-

* The author wishes to acknowledge the courtesy of the Digestive Ferments Company for their generous contribution of the media used in these studies.

TABLE 2

Soil	Per cent Death First 24 Hours Season		Per cent Loss * Moisture 48 Hours 20° C.	Days Known Survival	
	Wet	Dry		Wet	Dry
Adobe	25	45	5.0	42	21
Adobe peat	30	50	5.3	42	28
Loam	28	45	6.0	49	21
Sand	70	95	12.0	8	4
Peat	99.99		9.5	1	2

* Initial moisture = 20%

Average Maximum temperature
Wet Season 58
Dry Season 74

Average Minimum temperature
Wet Season 39
Dry Season 54

cupied a considerably larger volume, for example, than the adobe. Initially, the adobe suffered the least moisture loss, but as drying continues, this soil shows a great tendency to open up cracks and fissures.

The data from four sets of observations, two during California rainy seasons and two during dry seasons, are shown in Tables 1 and 3. The behavior in the first three soils is quite consistent throughout the series.

SUMMARIZING THESE DATA

The survival in all types of soil was greatest during the rainy season when moisture was occasionally added by the rains and when the rate of evaporation was low. The adobe-peat and loam held their moisture with greater tenacity than the adobe. In sand where drying was rapid the survival time was very short—between 4 and 7 days The rapid death in peat cannot be explained upon the same basis. Infusions of this peat indicated a pH of between 3 and 4, so that may be the answer. The experiments during the dry season demonstrate the same tendency, the essential difference lying in the shorter survival time. The effect of moisture on survival is brought out sharply in the second experiment (Table 3) where with a longer rainy season the survival is almost tripled. The effect of moisture retaining capacity is indicated by comparing the survivals in sand, sand-loam mixture, and loam.

Table 2 indicates certain additional observations having a bearing on soil properties and organism behavior during the first experiment.

TABLE 3

Eberthella Typhosus per Gram of Soil

Rainy Season 10.1 Inches of Rain

Soil	Initial	1 Day	15 Days	30 Days	45 Days	60 Days	75 Days	90 Days	105 Days	120 Days
Adobe	20,000,000	17,000,000	3,000,000	1,000,000	500,000	25,000	5,000	900	15	0
Adobe peat	21,000,000	17,800,000	3,200,000	900,000	500,000	17,000	3,000	400	0	0
Loam	20,500,000	17,200,000	2,900,000	950,000	480,000	20,000	4,500	500	30	3
Sand	21,000,000	7,000,000	250	0						
Loam sand	20,300,000	15,000,000	2,000,000	300,000	25,000	125	0	0	0	0

Dry Season 0.7 Inches of Rain

Soil	Initial	1 Day	2 Days	7 Days	14 Days	21 Days	28 Days	35 Days	42 Days
Adobe	23,000,000	13,000,000	5,000,000	600,000	30,000	450	25	0	0
Adobe peat	22,000,000	11,000,000	5,500,000	700,000	42,000	7,000	300	75	2
Loam	22,500,000	11,800,000	6,000,000	600,000	45,000	2,500	150	23	15
Sand	22,000,000	1,200,000	950	2	0				
Loam sand	22,000,000	8,000,000	2,000,000	100,000	75	0	0	0	0

Effort was also made to learn what rôle if any was played by sunlight in the destruction of the organisms. Pots with a finely pulverized loam-peat mixture were prepared as before but this time a layer of the top soil approximately ¼ inch deep was separated from the remainder by a sheet of thin gauze so that this top layer could be lifted off for examination without carrying over any soil from the deeper layers. The pots were exposed outside with one exposed to the full rays of the sun and the other shaded by a dark cloth 3 inches above the surface of the soil. Table 4 shows the results of this experiment: While the moisture loss was essentially the same in both pots the death rate was 36.0 per cent higher in the unshaded than in the control.

Various workers have investigated or commented on the bearing that other organisms in the soil might have on the survival of intestinal pathogens. Martin [5] reported *Bacillus typhosus* survival was longer in sterile than in normal soil. Rullmann's [7] investigations led to similar conclusions, and Smith,[9] although somewhat vague, appeared to concur. Mair,[11] on the other hand, disagrees with these conclusions. Frost,[13] using pure cultures of *Eberthella typhosus* and soil organisms in broth, showed that the metabolic products of a number of the latter had a definitely inhibitory effect on the typhoid organisms. Kligler,[12] in the course of his extensive researches, confirmed the observations of Frost but did not determine whether this inhibitive effect might be an expectancy in the soil itself.

To investigate this possibility six pots were prepared, inoculated, and exposed as before. Three strains of *Eberthella typhosus* were inoculated in duplicate, giving 3 pairs of inoculated pots. One pot of each pair was inoculated also with a washed culture of *Pseudomonas fluorescens* suspended in saline. The ratio of *Eberthella typhi* to *Pseudomonas fluorescens* was approximately 4 to 1. The other pots inoculated with *Eberthella typhosus* alone served as controls. The third pot count was slightly lower than in the control pot. The experiment was repeated three times with this last strain, but no real antagonistic effect could be demonstrated. Sometimes the control was a trifle higher, sometimes lower than in the other pot. A second series of experiments employing *Proteus vulgaris* in place of Pseudomonas yielded entirely similar results. Tests with the filtrates of these two genera according to Kligler's method demonstrated their "antagonistic" action in broth cultures of *Eberthella typhosus*.

Experiments with sterilized soils were not carried out inasmuch as that condition would never be obtained in nature.

When unbuffered loam was inoculated with *Eberthella typhi* in fecal suspension, the maximum survival was 52 days as compared with a survival period of 100 days in controls inoculated with saline suspensions and exposed during a rainy season with 10.1 inches of rain.

TABLE 4

Effect of Direct Sunlight on the Survival of Eberthella Typhosus

	Per cent Moisture Loss	*Eberthella typhi per Gram Soil*		*Per cent Death*
		Initial	*24 Hours*	
Top soil:				
Sun	41			
Shade	40	25,000,000	3,500,000	86
Lower soil:				
Sun	30	25,000,000	12,500,000	
Shade	30	25,000,000	12,500,000	50

A duplicate experiment carried on during the dry season with 0.3 inches of rain showed less difference, the fecal suspension dying in 27 days and the saline in 33 days.

Pursuing this possibility further, an inoculated soil was thoroughly wet with raw settled sewage and exposed with a control. No viable typhoid organisms could be recovered from the pot wet with sewage after the 45th day, whereas they were recoverable from the control pot up to the 85th day. The rainfall during this experiment totaled 8.1 inches. The pH of the soil in pot wet with sewage rose to 8.8 during the experiment, while that of the control remained at 7.8. Microscopic examination showed the presence of numerous protozoan types of organisms. No attempt was made to evaluate the factors of pH and protozoa. It is possible that those two factors may be too intimately related to consider separately.

The experiment was varied by inoculating solid feces heavily with typhoid organisms. These were lightly covered with earth and exposed outside. Viable typhoid bacilli could be recovered on the 30th day but not on the 35th day during a rainy season, and the 15th day, but not on the 20th day during the dry season.

In studying the significance of hydrogen ion concentration garden loam buffered to pH values of 6.5, 7.0, 7.5, and 8.0 were set up in pots and exposed out of door as before. Table 5 shows the results of experiments.

In general it is seen that variations between pH 6.5 and 7.5 are of little significance, that the loam provided a slightly better menstruum for survival than adobe peat mixture, and that the pH effect was relatively less pronounced in the dry season.

Loam at pH 7.0 was inoculated with approximately 18 million *Eberthella typhi* per gm., was sealed in a series of tubes, and placed in the freezing compartment of an electric refrigerator and examined at intervals of 6 months. Counts after 6 months showed a 70 per cent reduction, after 12 months a 95 per cent reduction, after 18 months over 99 per cent reduction. An occasional viable organism could be recovered after 24 months. In feces similarly stored no viable typhi could be demonstrated after 12 months.

SUMMARY

The longevity of *Eberthella typhosus* in soils exposed to natural conditions has been studied over a period of 4 years.

The most important apparent factor determining survival was moisture. This confirms the conclusions of other earlier investigators. This is directly related to the amount of rainfall, the moisture retaining power of the soil, and to temperature. Fifty per cent of typhoid bacilli will probably die during the first 48 hours. Survival of the remainder may extend over a period of months depending upon the conditions noted above.

TABLE 5

Effect of Soil pH on Survival of Eberthella Typhosus

	Days Survival			
	Rainy Season 6.3 Inches Rain		Dry Season 0.3 Inches Rain	
pH	Loam	Adobe-peat	Loam	Adobe-peat
6.5	80	75	29	25
7.0	87	77	30	27
7.5	105	100	36	30
8.0	90	81	25	21

Sunlight also exerts a definite lethal action, although its effect will be limited to surface pollution.

The survival is longer in natural soil than in sewage polluted soil. Death occurs more quickly in soil impregnated with fecal suspensions than with saline suspensions.

There was no evidence of antagonistic action by soil organisms such as *Pseudomonas fluorescens* and *Proteus vulgaris* in a soil environment.

The pH of soil can affect survival adversely, but does not seem to be important in the pH range of ordinary fillable soils.

Eberthella typhosus stored in moist soil at freezing temperature may survive as long as 24 months. In feces similarly stored the survival time is much shorter, but may, nevertheless, extend over several months.

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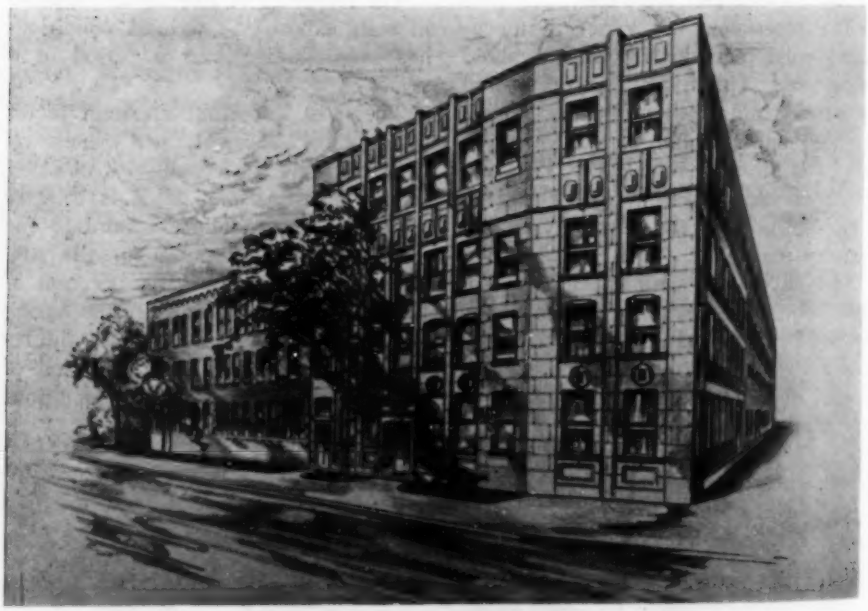

DIFCO LABORATORIES PLANT, 920 HENRY STREET, DETROIT

The many friends of this organization will put a visit to their headquarters on their "must" schedule while they are attending the Annual Meeting.

Wilson Method for the Bacteriological Examination of Water

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AMONG the numerous methods proposed for determining the coliform count of water the two most widely used are those of the American Public Health Association and the British Ministry of Health.

In the American Standard Method the water is inoculated into lactose broth; tubes showing gas are plated on Endo or eosine-methylene-blue agar; and one or more typical colonies are picked off into lactose and studied microscopically to see whether the contained organisms have the morphological and staining properties of coliform bacilli. By this means it is possible to determine the number of coliform bacilli present in the water, but not to form any idea as to whether these organisms belong to the fecal coli, the intermediate-aerogenes-cloacae, or irregular type.*

In the British Ministry of Health (1934) method, lactose broth is replaced by MacConkey's broth. Since this medium has a high degree of selectivity on account of the incorporation of 0.5 per cent bile salt, it is usual to accept the presumptive coliform count obtained in this way as the real coliform count. Differentiation, however, of the coliform bacilli is advised in certain circumstances which are carefully defined. This is carried out by plating one or more of the positive tubes on MacConkey agar, picking off three colonies from each plate, and submitting them to the methyl red (M.R.), Voges-Proskauer (V.P.), indol, and citrate tests.

In practice the American method suffers from the disadvantage that the presumptive coliform count in lactose broth is accompanied by a large error due to false positive reactions, and no differentiation is made between the types of coliform bacilli present. The Ministry of Health method, though free from these particular disadvantages, nevertheless uses a method of differentiation which is itself open to objection.

In the first place, if the various types of coliform bacilli differ greatly in number, and plates are made only from the tubes inoculated with the smallest quantities of water, the probability is that only one type will be revealed.

In the second place, even if the various types are more or less equal in number, it is very common for *Bact. coli* to outgrow *Bact. aerogenes* and other types in the MacConkey broth

* EDITOR'S NOTE: The classification of coliform organisms employed by the author is that of the British Ministry of Health. The group designated as "*Fecal coli*, or *Bact. coli I*" comprises those coliform organisms that give positive results with the methyl red, Voges-Proskauer, indol tests and gas in MacConkey broth at 44° C., but negative results with the citrate and the gelatin liquefaction 7 day tests. The group "*Bact. coli II*" comprises those coliforms that give a positive methyl red test, but negative results with all the other tests; their probable habitat is indicated as "doubtful, probably not primarily intestinal." The other designations are rather similar to those used in America, but complete details may be found in author's Reference No. 4, or *J. Am. Water Works Assn.*, 31, 7:1233 (July), 1939.

tubes. Consequently plates made from the fermented tubes often reveal a pure culture of *Bact. coli,* even when other coliform types were present originally. The colonies on the plates correspond, in fact, not to the types present in the original water, but to types present in the fermented MacConkey broth tubes.

To overcome the first disadvantage, it would be necessary to plate out every positive tube on MacConkey agar or other suitable medium, and to submit three or more colonies from each plate to the M.R., V.P., indol, and citrate tests. Though possible with some waters, this would often involve more labor and cost than could well be afforded in practice.

To overcome the second disadvantage, nothing but the use of highly selective media which would allow the development of different types of organisms, even if present in minimal numbers, would be of any value.

An attempt to overcome these two difficulties was made by Wilson and his colleagues (1935) in London, when engaged in a study of the bacteriological grading of milk. The method they devised, which is referred to as Method IV, consists essentially in the use of two selective media, one for the demonstration of *Bact. coli* I (see Table III), the other for the demonstration of the intermediate, *Bact. aerogenes,* and *Bact. cloacae* types (I.A.C.).

In practice the water is inoculated into MacConkey broth, as in the first step in the Ministry of Health method, so as to obtain the presumptive coliform count. *All* tubes showing acid and gas within 48 hours are inoculated into (1) tubes of MacConkey broth, and (2) tubes of Koser's citrate medium. The MacConkey broth tubes are incubated at 44° C. in a thermostatically controlled water bath; under these conditions with few expections, only strains of fecal coli give rise to *gas* formation. The citrate tubes are incubated at 37° C.; in this medium strains of I.A.C. type, but not usually *Bact. coli* I, develop. The 44° C. MacConkey tubes showing gas formation afford an index of the probable number of fecal coli, and the citrate tubes of the probable number of I.A.C. types present in the water.

This method is very simple and rapid. It enables not only a presumptive coliform count, but a differential count, to be completed within 3 or 4 days. It has been tried out on water with very favorable results by Bardsley (1938) at Manchester and, together with suggested modifications, is described in the latest edition of the Ministry of Health memorandum (1939) on the bacteriological examination of water supplies. Reference should be made to this publication for a full description of the method and its interpretation.

Since learning of this method in England, we have examined about 10,000 samples of water in the Argentine with highly satisfactory results. In addition, we have carried out certain controls of the main steps of the Wilson method. These we propose to describe in the following pages.

CONTROL OF THE PRESUMPTIVE COLIFORM COUNT IN WATER USING MAC CONKEY BROTH AT 37° C.

Tubes of MacConkey broth showing acid and gas formation at 37° C., which had been seeded with the smallest quantity of water, were plated on MacConkey or eosine-methylene-blue agar, and incubated for 24 hours. Coliform-like colonies were picked off, and studied for their morphological and staining properties and for their ability to form gas in standard lactose broth. They were also examined by the 44° C. MacConkey and the citrate tests. In this way 430 fermented MacConkey broth tubes were checked. The results are given in Table 1.

TABLE 1

The Accuracy of the Presumptive Coliform Count in MacConkey Broth at 37° C.

Origin of Water Samples	Fermented MacConkey Broths: 24 Hours: Controlled	24 Hours: Confirmed	24 Hours: Percentage Confirmed	48 Hours: Controlled	48 Hours: Confirmed	48 Hours: Percentage Confirmed
Surface (rivers)	77	77	100	231	205	89
Underground (wells)	19	16	84	103	81	79
Total	96	93	97	334	286	86

Total controlled (24 and 48 hours)..... 430
Total confirmed (24 and 48 hours)..... 379
Percentage confirmed (24 and 48 hours).. 88

It will be noticed that the percentage of cultures confirmed was (1) much higher with tubes showing fermentation within 24 hours than in those taking 48 hours, and (2) much higher with surface than with underground waters.

In considering this second observation it may be pointed out that the majority of the surface waters came from Buenos Aires, and were examined within a few hours, whereas all the underground waters came from various parts of the Argentine outside Buenos Aires, and were not examined until, in some instances, 2 days later. This circumstance may also be partly responsible for the fact that 40 out of the 51 false positive tubes contained coliform-like bacilli which failed to produce lactose-fermenting colonies on plates within 24 hours. It seems not improbable that many of these organisms were in reality coliform bacilli whose fermenting properties had become modified by the unfavorable conditions of transport. In support of this explanation is the fact that most of these organisms were derived from polluted waters which had been chlorinated. Some authors would ascribe the same sanitary importance to these organisms as to those of the coli-aerogenes group.

Of the remaining false positive tubes, 5 consisted of coliform bacilli which were typical except in their failure to ferment lactose at 37° C.; all of these produced gas in MacConkey broth at 44° C. In 6 false positive tubes no coliform bacilli could be demonstrated by plating, though Gram-positive rods were sometimes present.

Thus it appears that all but 6 of the false positive tubes contained bacilli which differed from coliform bacilli only in their failure to ferment lactose within 24 hours at 37° C., either on plates or in broth. False positives due to other types of organism were very few, and accounted for only 1.4 per cent of the whole series.

The high proportion of correct results obtained with MacConkey's medium is in agreement with the findings of many other workers who have had extensive experience of this medium, such as Bardsley (1938) in England, and Raghavachari and Iyer (1936) in India. It may be noted that from 550 waters producing acid and gas in MacConkey broth at 37° C. Bardsley was able to isolate coliform bacilli in every instance. Not a single false positive due to non-coliform bacilli was encountered.*

* EDITOR'S NOTE: See also this *Journal*, 29, 11, 1250 (Nov.), 1939.

CONTROL OF THE FECAL COLI COUNT IN WATER USING MAC CONKEY BROTH AT 44° C.

As in the previous experiments we examined tubes of MacConkey broth showing acid and gas at 44° C. by plating on MacConkey or eosine-methylene-blue agar, picking 3 colonies, and testing them by the M.R., V.P., citrate, and indol tests. The 44° C. MacConkey broths had been inoculated directly from fermented 37° C. MacConkey broths which had been seeded with the smallest quantity of water. In this way we checked 309 positive 44° C. tubes with the results shown in Table 2.

TABLE 2

The Accuracy of the Fecal Coli Count in MacConkey Broth at 44° C.—Water

	44° C. MacConkey Broths Inoculated from MacConkey Broths That Had Fermented at 37° C. in					
	24 Hours			*48 Hours*		
Origin of Water Samples	*Controlled*	*Confirmed*	*Percentage Confirmed*	*Controlled*	*Confirmed*	*Percentage Confirmed*
Surface (rivers)	205	199	97	49	47	96
Underground (wells)	42	40	95	13	11	85
Total	247	239	97	62	58	94

Of the 309 tubes fermenting MacConkey broth at 44° C., 294 yielded *Bact. coli* I (fecal), 3 *Bact. coli* II, and 6 intermediate, *Bact. aerogenes*, or irregular strains, while from the remaining 6 no growth was obtained on solid media. In other words, the 44° C. MacConkey test yielded correct results in at least 95 per cent of tubes.

Of practical interest is the fact that 95 per cent of the tubes fermenting MacConkey broth at 44° C. did so within 24 hours, thus enabling differentiation to be made in 2 to 3 days from the primary inoculation of the water.

CONTROL OF THE SPECIFICITY OF THE 44° C. MAC CONKEY TEST FOR FECAL COLI IN SEWAGE AND FECES

Sewage from Buenos Aires and animal feces from various sources were plated on eosine-methylene-blue agar and incubated for 24 hours at 37° C. Typical colonies were picked off and tested by the M.R., V.P., citrate, indol, and 44° C. MacConkey broth tests. The organisms were grouped according

TABLE 3

The Specificity of the 44° C. MacConkey Broth Test for Fecal Coli: Sewage and Feces

			Feces from							
	Sewage		*Sparrow*		*Pigeon*		*Viguá*[1]		*Cattle*	
Type of Organism	*No. of Strains*	*Positive at 44° C.*	*No. of Strains*	*Positive at 44° C.*	*No. of Strains*	*Positive at 44° C.*	*No. of Strains*	*Positive at 44° C.*	*No. of Strains*	*Positive at 44° C.*
Bact. coli type I	116	115	85	85	198	198	60	60	504	499
Bact. coli type II	3	1	0	0	1	1	0	0	0	0
Intermediate type I	34	0	0	0	0	0	0	0	0	0
Intermediate type II	26	0	0	0	0	0	0	0	0	0
Bact. aerogenes type I	40	0	0	0	1	0	0	0	1	0
Bact. aerogenes type II	3	0	0	0	0	0	0	0	0	0
Bact. cloacae	0	0	0	0	0	0	0	0	0	0

[1] The Viguá (*Phalacrocorax olivaceus*, Humboldt) is a bird, similar to the Brazilian Cormorant, that is common over the settling basins of water purifying plants.

to the classification given by the Ministry of Health (1939). Altogether 222 colonies from sewage and 850 colonies from feces were examined. The results are recorded in Table 3.

Of 963 strains classified as *Bact. coli* I, all but 6 produced gas in MacConkey broth at 44° C., while of 105 other coliform strains, excluding 4 strains of *Bact. coli* II the fecal origin of which is in some doubt, not a single one did so. It would be unreasonable to demand a greater degree of specificity for any test.

The 44° C. MacConkey broth test thus affords a rapid and accurate method for differentiating *Bact. coli* I, the typical inhabitant of the intestine, from other coliform organisms whose primary habitat appears to be most frequently outside the animal body.

CONTROL OF THE INTERMEDIATE-AEROGENES-CLOACAE COUNT IN WATER USING KOSER'S CITRATE AT 37° C.

Positive cultures in Koser's citrate medium, which had been seeded from fermented MacConkey broth tubes inoculated with the smallest quantity of water, were plated on eosine-methylene-blue agar. Three colonies were picked off 24 hours later and studied in the usual way. The results are recorded in Table 4.

A considerable difference was noticeable between citrate-positive tubes inoculated from 37° C. MacConkey broths that had fermented within 24 hours and those that had taken 48 hours. In 92 per cent of the former coliform bacilli were found, but in only 61 per cent of the latter. The reason for this difference is not clear.

Examination of the colonies that developed on plates streaked from the false positive citrate tubes showed them to consist of non-lactose-fermenting Gram-negative coliform-like bacilli. What were these organisms? Were they non-lactose or late lactose-fermenting bacilli which were present in the original water, and which developed particularly during the second day of incubation of the 37° C. MacConkey broths, or were they organisms of the I.A.C. group that had temporarily lost their power of fermenting lactose within 24 hours?

Our observations were not sufficiently extensive to answer these questions, but it seems probable that many of the organisms belonged to the second class. For example, analysis of 142 false citrate positives showed that 108 had been inoculated from 37° C. MacConkey broths which had failed on subculture to produce gas in MacConkey broth at 44° C. In other words, the 108 37° C. MacConkey broths contained no fecal coliform organisms, and the fermentation of lactose in these tubes must have been due

TABLE 4

The Specificity of Koser's Citrate Medium for Organisms of the I.A.C. Group—Water

Origin of Water Samples	*Positive Citrate Tubes Inoculated from 37° C. MacConkey Broths Showing Fermentation at*					
	24 Hours			*48 Hours*		
	Controlled	*Confirmed*	*Percentage Confirmed*	*Controlled*	*Confirmed*	*Percentage Confirmed*
Surface (rivers)	64	59	92	151	86	57
Underground (wells)	36	33	92	191	122	64
Total	100	92	92	342	208	61

to organisms of the I.A.C. group, or to some non-coliform type of organism. Since examination of Table 1 shows that the total proportion of false positives in 37° C. MacConkey broth was only 12 per cent, it is difficult to avoid the conclusion that the great majority of the positive citrate tubes must have contained coliform bacilli, even though their presence could not be demonstrated by direct plating.

It would therefore appear that the relatively high proportion of false positives in Koser's citrate medium seen in Table 4 is more apparent than real, and that the specificity of the citrate test for organisms of the I.A.C. group, while not so high as that of the 44° C. MacConkey test for fecal coli, is nevertheless of a reasonably high order.

It may be noted that, though fecal coli was found on some plates made from positive citrate tubes, it was invariably accompanied by members of the I.A.C. group. That is to say, no false positives in citrate were due to fecal coli.

COMPARATIVE STUDY OF THE AMERICAN STANDARD AND THE WILSON METHODS

Finally we should like to refer to a comparative examination made on 499 waters by the American Standard and the Wilson methods. The samples were collected in Buenos Aires and in other parts of the Argentine. About 70 per cent were from chlorinated supplies.

In recording the results of the Wilson method, we have confined ourselves to the coliform count, since it is this alone which is common to both methods. The differential counts of fecal coli and I.A.C. organisms, which were obtained by the Wilson method, are omitted from Table 5, though the number of tubes giving a positive 44° C. MacConkey and a positive citrate test are included for the sake of interest.

On the whole, the number of samples in which the presence of coliform bacilli was confirmed was remarkably similar in the two methods. The number of discrepant results was 39 in a total of 3,245 tubes inoculated, or just over 1 per cent.

TABLE 5

Comparison of the American Standard and the Wilson Methods

			American Standard Method		*Wilson Method*				*Coliform Organisms*	
Origin of Water Samples	*No. of Samples Examined*	*No. of Tubes Inoculated*	*No. of Tubes + Lactose Broth*	*No. and % of Tubes Confirmed*	*No. of Tubes + 37° C. MacConkey*	*No. of Tubes + 44° C. MacConkey*	*No. of Tubes + Citrate*	*No. and % of Tubes Confirmed*	*Wilson + Standard −*	*Wilson − Standard +*
Surface unchlorinated	111	569	292	198 (68)	228	169	187	200 (88)	4	2
Underground unchlorinated	45	315	43	31 (72)	44	18	31	36 (82)	6	1
Total	156	884	335	229 (68)	272	187	218	236 (87)	10	3
Surface chlorinated	294	1,998	864	119 (14)	140	93	74	128 (91)	15	6
Underground chlorinated	49	363	39	8 (20)	11	2	10	9 (82)	3	2
Total	343	2,361	903	127 (14)	151	97	84	137 (91)	18	8
Grand Total	499	3,245	1,238	356 (29)	423	284	302	373 (88)	28	11

The number of positive tubes was a little higher by the Wilson method, suggesting a slightly greater degree of sensitivity. The reason for this appeared to be due mainly to the failure, in the American Standard method, of typical lactose-fermenting colonies to develop on eosine-methylene-blue agar plates within 24 hours. Two causes seemed to be responsible for this: (1) In some waters containing slow lactose-fermenting organisms, such as in certain well waters, the colonies on plates examined after 24 hours were still colorless, though when incubated for a further 1 to 2 days they developed into typical lactose fermenters. (2) In some waters organisms of the *Pseudomonas* group were common, and these overgrew the coliform organisms on plates and prevented their developing into typical lactose-fermenting colonies. Some of the positive results given by the Wilson method may, of course, have been caused by the growth of non-coliform organisms in citrate, though these do not appear to have been numerous.

Analysis showed that in all but one of the 39 discrepant results, the average number of coliform organisms was only 2.2 per 100 ml. In relatively pure waters of this type the sampling error alone may well have been sufficient to account for many of the discrepancies observed.

It is interesting to note that a very small proportion of fermented lactose broth tubes in the American Standard method were confirmed on plating. With chlorinated waters, for example, this proportion was only 14 per cent. Analysis of the figures obtained with the Buenos Aires waters, which cannot be given in detail here, showed that the proportion was lowest of all with *freshly* chlorinated waters. In one series of 77 fermented lactose broths inoculated from such waters only one tube was confirmed.

DISCUSSION

From the results given in this paper it will be realized that the Wilson method of examining waters is very rapid and affords an assessment not only of the coliform bacilli present, but also of the proportions of *Bact. coli* on the one hand, and of the intermediate, *Bact. aerogenes*, and *Bact. cloacae* types on the other.

The 44° C. MacConkey broth test, *provided it is carried out with the precautions laid down in the Ministry of Health Report (1939)*, serves as a most reliable, delicate, and rapid index of the presence of fecal coli.

The use of the citrate test for detecting organisms of the I.A.C. group is less specific, but since the occurrence of these organisms in the concurrent presence of fecal coli is of little help in interpreting the results of the water examination, and since their occurrence in the absence of fecal coli may be regarded as indicative of no immediate danger, and a confirmatory plating test may be made if necessary, this drawback is of less importance than might appear at first sight.

The fact that the Wilson method enables a confirmed and a differential coliform count to be completed in the same time as that required by the American Standard method for the coliform count alone, and the fact that it dispenses with plating and with microscopical examination, are two advantages which justify its trial on a more extensive scale.

SUMMARY AND CONCLUSIONS

1. An attempt has been made to confirm the accuracy of the various steps used in the Wilson method of performing the coliform and differential coliform counts on water. This method, which is simple and rapid, consists in the use of MacConkey broth at 37° C. for the presumptive coliform count, followed by subculture of all fermented tubes into MacConkey broth at 44° C. for the fecal coli count and into Koser's citrate at 37° C. for the intermediate-aerogenes-cloacae count.

2. Control of the presumptive coliform count in MacConkey broth at 37° C. by plating and examination of the resultant colonies was carried out on 430 fermented tubes inoculated from surface and underground waters. Of tubes showing fermentation within 24 hours, 97 per cent were confirmed, while of those not showing fermentation until the second day, 86 per cent were confirmed. The fact that the proportions were higher in samples of Buenos Aires waters, which were examined on the same day, than in waters from other parts of the Argentine, which sometimes required 1 or 2 days to reach the laboratory, suggests that the ability of contained organisms to form lactose-fermenting colonies on plates in 24 hours may have been affected by the unfavorable conditions of transport.

3. Control of the fecal coli count in MacConkey broth at 44° C. in water was made by plating out 309 fermented tubes, picking off colonies, and ascertaining to which type they belonged by the usual differential tests. It was found that 294 contained typical *Bact. coli* I, while 3 contained *Bact. coli* II. At least 95 per cent, therefore, of the results were confirmed.

4. Further control of the 44° C. MacConkey test was made by plating out sewage, animal feces, and bird feces, picking off lactose-fermenting colonies, ascertaining their type by the usual differential tests, and inoculating them into MacConkey broth at 44° C. Of a total of 963 colonies classified as *Bact. coli* I, all but 6 produced gas in this medium, while of 105 other coliform strains, excluding 4 strains of *Bact. coli* II, the fecal origin of which is in some doubt, not a single one did so. The error of the 44° C. MacConkey broth test as an index of fecal coli was therefore less than 1 per cent.

5. The Koser citrate test at 37° C. for detecting the presence of coliform organisms of the I.A.C. group in water was controlled by inoculating 442 fermented 37° C. MacConkey broth tubes into citrate, plating out all tubes showing growth, and studying the colonies in the usual way. Of positive citrate tubes that had been inoculated from 37° C. MacConkey broths fermenting in 24 hours, 92 per cent were shown to contain coliform bacilli, whereas of those inoculated from MacConkey broths not fermenting until the second day, only 61 per cent were confirmed. A large proportion of the false positives in citrate medium were due apparently to the failure of coliform bacilli to produce typical lactose-fermenting colonies or to ferment lactose broth within 24 hours. In other words, the relatively high proportion of false positives was probably more apparent than real.

6. A comparison was made between the American Standard and the Wilson methods on 499 waters, paying attention merely to the confirmed coliform count. The results, on the whole, were in close agreement. In a series of 3,245 tubes inoculated with water, the final discrepancies were only 39 in number, or a little over 1 per cent. The Wilson method was positive 28 times when the American Standard method was negative, and the latter was positive 11 times when the Wilson method was negative. In all but one of the 39 discrepant results, the waters were of a relatively high degree of purity, containing an average of only 2.2 coliform bacilli per 100 ml.

7. In view of the simplicity and accuracy of the Wilson method, and the fact that it gives a differential as well as a confirmed coliform count in the same time as that required by the American Standard method to give a coliform count alone, the method seems worthy of trial on a more extensive scale. During the year 1938 we examined about 10,000 samples of water by this method with highly satisfactory results.

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Health Education through the Ages*

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HEALTH education is as old as medicine. Even in primitive societies parents have to tell their children of the dangers of poisonous snakes and inedible plants and of the ways in which disease may be prevented by placating the wrath of gods and demons. But though health education is as old as education itself, it has nevertheless undergone decisive changes. Not only were the forms and ways of health education of former times different from ours in many respects; its very concept was sometimes contrary to ours. To a medieval ascetic like St. Bernard the sight of crippled and sick people evoked the comforting thought that their sufferings would soon end and real life begin.[1] Toward the end of the Middle Ages death and decomposition were represented in pictures and poems as reminders of the vanity of beauty and health.[2]

It is not possible in a short time to review the entire historical development of modern health education. I shall, therefore, not try to lead you through the ages in an orderly fashion, beginning with prehistoric man and ending with our present meeting at Pittsburgh. Instead I shall group my remarks around two questions: whose was the task to educate, and who was to be educated?

Today, in a democratic country, the aims of health education are democratic too. We try to make everybody health-conscious and to show to everybody how best to preserve his health. This we can do because in our modern society we possess the means through lectures, newspapers, pamphlets, exhibits, moving pictures, and radio to reach even those who have not been trained in biology and who cannot afford the constant attention of the physician.

Now the democratization of health education has been the result of a long and complicated development. In the democratic age of the ancient Greeks we find something similar, though of course on a very limited scale. At least all the people, rich and poor alike, received such advice as the physicians had to give. Among the writings which go under the name of Hippocrates there are several treatises discussing the general causes of health and disease. It is very probable that some of these writings were speeches made by physicians before crowds of people, and one of these books represents the earliest attack against superstitious medicine and the treatment of disease by magicians, sorcerers, and quacks. It deals with epilepsy, which the people called "the sacred disease." It tells the reader, or perhaps the listener, that this is just as natural a disease as all others, curable without magic by purely natural means—provided the cure is begun early.

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But at this time it was already felt that the same kind of medical advice was not valid for everybody. There were people who had to spend their day in work and who, therefore, could observe but relatively few of the hygienic rules laid down by the physician. There were others who could devote their time to following all the minute prescriptions of the Greek physicians. This differentiation we find in Hippocratic authors as well as in Diocles of Carystus, the great physician of the 4th century B.C. It is partly accounted for by the peculiar character of ancient hygiene and medicine. Whereas the prevention of infections plays such an important rôle in modern health education, this point is scarcely recognized by the ancient health educators. Instead, they stress the kind of food to be eaten and to be avoided, the exercise to be taken, and the position to be assumed during sleep. They were chiefly concerned with the correct regimen, and this to a point which must have led to the education of hypochondriacs, people whose days were spent in keeping themselves healthy. It is in continuation of this tendency that in the later days of antiquity we find the Greek physicians in Rome demanding that hygiene should find its place in a liberal education. Comprehensive books on hygiene and medicine were written for the laymen, *i.e.*, the well educated laymen, whereas little was done to educate the mass of the people. This is proved by the fact that most of these writings were composed in Greek, while but few books were written in Latin, the language of the Romans.[3]

With the coming of the Middle Ages, with the passing of government into the hands of barbaric people, health education gradually ceased to be a matter of primary concern. But it by no means stopped altogether. It found a new, though modest, field of activity at the courts of kings, at monasteries and cathedral schools. We still possess the dietetic letter of the physician Anthimus to the Frankish king Theuderich and various short hygienic texts were now addressed to real or imaginary princes. Even the famous "Regimen" of the School of Salerno, which in its literary form hails from about 1300 A.D., belongs in this category, as is seen from the beginning of the poem:

The *Salerne Schoole* doth by these lines impart
All health to *Englands King*, and doth aduise
From care his head to keepe, from wrath his heart,
Drinke not much wine, sup light, and soon arise,
When meate is gone, long sitting breedeth smart:
And after-noone still waking keepe your eyes.
When mou'd you find your selfe to *Natures Needs*,
Forbeare them not, for that much danger breeds,
Vse three Physicions still; first Doctor *Quiet*.
Next Doctor *Merry-man*, and Doctor *Dyet*.[3a]

The importance of this type of literature was very great. Apparently written for a king, it acquires authority. Its Latin language destines it first for the physician and other more educated men. But its poetic form, which appeals so strongly to the ear, assured its propagation over great masses of the people and generations of men. For it was translated into vernacular languages and both a German and French version are found among the medical incunabula. The medical incunabula in vernacular languages give us considerable insight into the health education of the later Middle Ages. In Germany alone about 450 items were printed between 1450 and 1500! The bulk of this output was decidedly intended for the average people. It comprised general medical works including pediatrics and advice for pregnancy and childbed, dietetic works on bloodletting, food, beverages, and bathing, often in the primitive form of calendars; tracts on pestilence and syphilis, but also some

popular works on science with reference to medicine and veterinary surgery.[4] The authors were often physicians and surgeons, and a look at the vernacular literature in France,[5] England, and Germany during the 16th century shows the same trend toward the spread of medical information among broad masses of the people.

The work of these early health educators struck deep roots in the people of Europe. It is through popularized verses from the "School of Salerno," through the memory of things read by parents and grandparents in calendars, and through a long oral tradition, that many teachings of a past medical system are still alive today. Such survivals show the responsibility that rests upon health education. Once its teachings have met with popular response they are not easily forgotten and may outlast the generation to which they were addressed and sometimes even their validity.

Another focus of medieval health education is to be found in some early medieval monasteries where the monks set a good example for eating and drinking at a time when people were usually given to gross excesses. During the school reform of the Carolingian period it was ordered that medicine should be included among the subjects of the curriculum. This was a faint reminiscence of the rôle of medicine in the liberal education of the Romans and probably did not reach further than a group of clerics and a few laymen. At this early period the most effective educational work of the church was the fight against superstition. At the Council of Tours (813) it was ordered that the priests should tell the faithful that sorcery and amulets did not cure disease.[6]

It is from the early Middle Ages on that the priest assumed his function as health educator equal to if not surpassing the importance of the physician. This was, of course, not the first time in the history of mankind that the priest took over this rôle. In this connection it may suffice to remember the hygienic significance of many Biblical laws based on the idea of religious cleanliness and going back to the even older religions and customs of Egypt and Babylonia. However this may be, the influence of clerical and religious health education was far-reaching in the Middle Ages and later centuries. Popular preachers like Berthold of Regensburg in the 13th century, as well as Thomas Thatcher in the 17th, gave not only moral instructions to the people but medical advice too. The moral and religious aspect given to health education lasted far into the 19th century and even into our own days. The underlying idea was that "God predestines each human being to a certain span of life. Nothing can extend this span; but sins and follies can shorten it; only through virtue and piety can a man enjoy the full tale of years allotted to him."[7] Moral sins and medical follies thus went together. Disease was often taken as a direct sign of punishment for sin, and imperial and other edicts tried to restore health by commanding a moral and virtuous life to the people. Particularly in the field of venereal diseases, moral exhortations became the strongest though perhaps not always effective means of health education. It became a practice in the 18th century to take young men to the syphilis wards of hospitals to demonstrate the terrible consequences of immorality.

So far we have considered the physician and priest as health educators. Their efforts were supplemented to a certain degree by governmental authorities—to a certain degree only, because the authorities in early times did not so much act as health educators as health legislators.

Down to the end of the 18th century,

governments did not show any great interest in the health education of the people. This is understandable if we realize that in the absolutist states of the time the people were chiefly an object of administration. If the government was benevolent and enlightened, it would provide good medical schools, regulate medical practice, and it would see to it that laws protected the health of the people. This line of thought is reflected in Johann Peter Franck's *System of Complete Health Police*. The whole field of state medicine and public health is discussed, law after law is proposed to keep the people healthy, meddling with many details of daily life. As the title of the book indicates, it is the idea of health enforcement which occupied Franck, and perhaps it was not by chance that he spent much of his life in the absolutist countries of Italy, Austria, and Russia.

Yet in the same 18th century democratic ideas gave a strong impetus to health education. Enlightenment, the catchword of this century, also included enlightenment in matters of health. The fight against superstition in general was also extended against medical superstitions. The popular calendars were reformed; many popular books and even magazines discussed medical subjects for the more educated public. The middle classes who were largely the carriers of the new philosophy could be counted upon to show interest and understanding for medical advice. But the problem remained of how to reach the poor and uneducated. Tissot, a Swiss physician and one of the main representatives of medical enlightenment, hit upon the following idea: The common people, particularly in rural districts, could not be reached directly, and yet their health above all needed improvement. Why not reach them indirectly through the owners of estates, ministers of the church, surgeons, midwives, and school teachers? Let these people be instructed in medicine and let them care for the peasants where no physicians were at hand. Tissot embodied this idea in his famous *Advice to the People in General with Their Health*, a popular textbook of medicine which taught the educated how to treat the uneducated. This book met with great success, but it could not solve the problem. If all the people were to be instructed in matters of health, then it was necessary to provide for the elementary education of all. In other words, it was necessary to spread education and to enlist the teacher as a health educator. Suggestions in this direction had been made several times, but nobody approached the task with such enthusiasm as Dr. Bernhard Christoph Faust in his *Catechism of Health*, which was first printed in German in 1794, and even reached this country in an English translation in 1798. The following "observation" may give us an idea of how Faust tried to make his pupils health-conscious:

> If a child be present who was ill not long ago, the Master will take the opportunity of asking him the following question:—"You was ill; tell me did you feel yourself so happy, so easy as you do now?" To this a sensible child will answer, or will be taught to answer—"I found myself exceedingly ill, I could neither eat, drink, nor sleep; nothing afforded me pleasure or joy; I was full of anxiety and pains; but now restored to health; thanks be to God, I know it is the greatest good." [8]

If this form was dogmatic and sometimes naïve, most of the instructions given were nevertheless sound even from a modern point of view.[9]

The contribution of the 18th century to the development of health education can hardly be overestimated. For even today the work of health education is greatly one of enlightenment. But to the 19th and 20th centuries fell the task of making health education effective and putting it on a broader basis.

If in earlier times physician, priest, and teacher had acted mainly as individuals, the 19th century now witnessed an organization of forces. Associations, both lay and professional, were formed which made health education their aim. In this connection I should like to mention "The American Physiological Society," founded in Boston in 1837, which was not a scientific organization but a group of laymen interested in the discussion and propagation of hygienic ideas.[10] It did not last long, but its work was continued by other agencies too numerous to mention. Government officials, organized medicine, nurses, public health workers, welfare workers, educators, and many others are now engaged upon a task to which the progress of modern medicine gives definite direction. To discuss details of this recent development before you would be a presumption on my part. Let me therefore stop here and apologize for this incomplete sketch of the history of health education. All I could attempt was to indicate a few steps in the development of a great democratic idea.

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. . . Sir Edward Cook once made the assertion: "There is no book so good that it is not made better by an index, and no book so bad that it may not by this adjunct escape the worst condemnation," and he goes on to say: "A friend of Francis Douce, the antiquary, had a curse of his own for those who sent out a book without an index where one was obviously wanted; he damned them 'ten miles beyond Hell.' For my part, I think that simple damnation is enough."—A. T. Mathers, *Mental Hygiene*, April, 1940, p. 317.

Programs for Public Health Nurses in Birth Control Work*

Outline Developed in North Carolina State Board of Health for Staff Education

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IT is with pleasure that we accept the privilege of submitting for your consideration a brief outline of the birth control program sponsored by the North Carolina State Board of Health, with special attention given to the duties which devolve upon the public health nurse. Needless to say, the interest, intelligence, and training of the nurse is a large determining factor in the success of the birth control program. The North Carolina public health nurses, having realized the need for this service, have coöperated fully in setting up and making workable the various phases of the project.

To review briefly: Two and a half years ago, Dr. Carl V. Reynolds, Secretary-Treasurer and State Health Officer, approved the project, and placed it in the Division of Preventive Medicine, thereby making it possible for the State Board of Health to pioneer in initiating and developing a birth control program in connection with the whole-time City, County, and District Health Departments. Dr. George M. Cooper, Assistant State Health Officer, and the Director of the Division of Preventive Medicine, and Dr. Clarence J. Gamble, a member of the faculty of the Medical School of the University of Pennsylvania, were largely responsible for this progressive step. Quietly and without publicity, plans were devised whereby indigent mothers, overburdened by too frequent pregnancies, and in most cases suffering from disabling diseases, might be given contraceptive advice through their county health officials. For years Dr. Cooper had realized that something definite should be done to control the birth rate among the diseased of the indigent class, and at the same time bring relief and better health to a large group of indigent helpless women whose pleadings for birth control information had long gone unheeded, especially in view of the fact there were no longer federal or state legal restrictions against giving this information.

At the time this program was launched there were two centers already operating in the state—one at Fayetteville, in the eastern section, adjacent to the vast coastal plain; the other in the city of Asheville, in the mountain region.

The state sponsorship of local health department programs had its beginning on February 14, 1937, when the staff of the State Board of Health was informed that Dr. Gamble was willing to finance a program of establishing birth control centers in connection with

* Part I read before the Public Health Nursing Section of the American Public Health Association at the Sixty-eighth Annual Meeting in Pittsburgh, Pa., October 18, 1939.

county health departments. The board accepted this arrangement and approved the plan to employ a special field nurse to work under the direction of the Division of Preventive Medicine in organizing centers and correlating their service with the regular activities of the local health departments. Thus came into being the first birth control program sponsored by any state department of health.

The objectives of this program were threefold:

1. To reduce the high infant death rate and the loss of mothers' lives.
2. To curb the high birth rate among dependent families and create an awareness of the importance of proper spacing of all future children of the state as the prerequisite for healthful and happy family life.
3. To endeavor to increase the birth rate among the physically fit, and the financially and intellectually competent.

A statement of the policies safeguarding these first contraceptive centers and those that were to follow was made by Dr. Cooper in a letter announcing the plan to county health officers.

He said in part:

There is no argument about the necessity for attempting to prevent further births by the woman who has eight or ten children and who is diseased and whose life would be in jeopardy by further childbearing. The problem is to do something about it before that stage is reached. We are interested only in the medical indications upon which practically every physician would be in agreement, that is, in trying to prevent legitimately further births among women who are bad maternal risks, both for themselves and for their babies.

There has been no effort and there will not be any effort to induce any health officer or any medical society to take action, unless the request comes from the health officer himself and his own medical society. Our work, of course, is more largely experimental in order to try to determine the practicability of any plan of this character. The work is strictly for indigent patients who have not and do not now have the advice of private physicians in these matters such as their more fortunate sisters have always had.

I want to repeat that the work is being done in strict accord with medical opinion wherever undertaken and through the specific direction of the local health officer. My purpose in writing this letter is, first, to inform you of this program officially and, second, to express the hope that you will discuss the matter at your convenience with your local physicians and also lend a sympathetic ear to the appeals of the welfare officer at any time that official should appeal to you.

It might be said here that the way had been paved to a great extent for setting up the birth control program of the State Board of Health through an educational program carried on for many years by the North Carolina Conference for Social Service, backed by the State Board of Charities and Public Welfare. Both of these associations adopted resolutions in 1932 favoring birth control work. Another organization which was a more recent outgrowth of the North Carolina Conference for Social Service and which did valuable service in creating public opinion in behalf of a birth control program was the North Carolina Maternal Health League, organized in 1935. All of these organizations did excellent groundwork in educating the state's leading men and women to seek a better medical and health program for indigent mothers.

Something of the sentiment of the people of the state in their support of this program is seen in the resolution adopted by several leading state organizations. The North Carolina Conference for Social Service at its general session in Greensboro on April 25, 1938, the North Carolina Federation of Women's Clubs at a general session in Wilmington on April 29, 1938, and the North Carolina Federation of Business and Professional Women's Clubs at their general session held at Goldsboro on June 16, 1938, adopted the following resolution:

We desire to see birth control centers established in every county in the State for mothers who for economic reasons are de-

pendent upon the Board of Health, and are entitled to have a reliable source where prevenceptive instructions may be obtained; and we commend the State Board of Health, the State Health Officer, the Assistant State Health Officer, and Dr. Clarence J. Gamble for the advanced step taken in sponsoring the progressive and intelligent birth control program through the field of public health.

As the birth control program is now set up and operated in North Carolina, it supplements the state's maternal and child health service. It rounds out a program otherwise incomplete for the distressed mother desiring better health for herself, her family, and future children. Patients are admitted to the centers for a number of reasons—enough children already, child spacing desired, and for any other justifiable medical indication.

In clinic procedure, there is variation and adaptation according to local needs. In some centers patients are referred to hospital clinics, in others to family physicians, private physicians, health department clinics, or they are instructed through home visits by public health nurses. The last plan is employed more generally in the rural districts, and the state is largely rural.

Training for public health nurses in birth control work is based upon the same fundamental principles as of the standard public health nursing program. In general the nurse should have:

1. An understanding of the need for a public health birth control program.
2. Ability to correlate this particular service with other phases of routine clinic and home visits.
3. Judgment in selecting cases and in interpreting their attitudes.
4. Appreciation of the importance of giving careful and definite instructions, and faithfulness in follow-up work.
5. Watchfulness to see that the case load of the general program does not crowd out the prevenceptive program. This is most essential if any enduring service is to be rendered of a definitely established plan.

The short time in which the North Carolina birth control program has been in operation is probably not sufficient to produce accurate statistics. As a matter of fact we consider it still in the experimental stage. However, the growth of the work is seen in the following figures: In March, 1937, at the time the state program was initiated, there were two clinics operating with a total of 84 patients. At the end of the first year after the state program was inaugurated, there were 36 centers operating in 33 counties, which had reached 641 mothers. At the end of the second year, a survey showed there were 62 centers in 60 counties, which had instructed over 2,000 patients. A recent survey indicates there are now 4,000 cases.

Another indication that the general program is getting results is that the vital statistics of the state during the first 6 months of this year compared with the first 6 months of 1938 showed a decrease in both infant and maternal deaths, there being 316 fewer deaths of babies and 45 fewer deaths of mothers. The birth rate from January through June, 1939, was 21.6 as compared with 22.6 in 1938, while the death rate dropped from 10.0 to 9.2. A decrease of 1,255 births and 1,132 deaths is reflected during the first 6 months of 1939 as compared with the same period in 1938.

Arrangements have been made with the Institute for Research at the University of North Carolina to make a careful study of the case records kept by the health departments to determine the effectiveness of the different methods employed and the success of the general program. It is believed that a much longer period of time will be necessary in order to make an authoritative study.

A carefully worked out program of staff education has been a fundamental procedure in developing the state-wide birth control program in the North Carolina State Board of Health.

An Official Declaration of Attitude of the American Public Health Association on Desirable Standard Minimum Functions and Suitable Organization of Health Activities

AT the request of the Executive Board, a report adopted by the Association in 1933 under the above title has been revised for consideration by the Executive Board and the Governing Council at the 69th Annual Meeting in Detroit. This proposed revision, which now carries only the approval of the Committee on Administrative Practice, is published for the information of the membership.

I.

General Considerations

The people of North America have, for the past ten years and more, enjoyed a condition of good health not previously attained for any great population group of diverse races. This is not merely an accident of good fortune, not wholly an unearned asset of favorable climate or geography, nor a result alone of higher living standards than prevail in some other nations of Western civilization.

The consistent continuous use of the medical and associated sciences through civil government is largely responsible for the present high level of health among the people of this continent, their entire freedom from certain pestilential diseases prevalent in former times, and the progressive reduction in the spread of epidemic disease still commonly experienced.

As a result of 75 years of practical experience, the basic principles of official health services are now everywhere recognized as necessary in any community of modern society. These have been accepted generally by the governments of the United States and Canada, and are universally endorsed by the several professions concerned.

The American Public Health Association, believing that the present high state of health of the citizens of the country is in a large measure the result of public interest in personal and public health developed through the work of state and local health departments, and believing further that a sound national health demands the continuation of state and local public health activities on a comprehensive basis, providing at least for the minimum essentials of health protection and promotion, has set down the following fundamental principles of program, administration, and organization, which may be used as a guide to health officers and other interested persons. These essentials as

expressed should be considered as minimum requirements compatible with the preservation and promotion of public health. The conservation of the public health has long been recognized as one of the essential functions of government. The protection and promotion of the health and the welfare of the citizens are conceded by all authorities on political science to be inherent duties of the modern state, although the obligation may be delegated in large part to its political subdivisions.

The American Public Health Association calls upon the appropriate legislative and executive officers of the national, state, and provincial authorities, and upon the rural and urban local governments of this continent to take such action as will secure the continued improvement in the people's health upon which alone permanent security and happiness of life is founded.

II.

Scope and General Policy of Public Health Work

Remarkable advances in the medical sciences have increased the means of controlling disease. To be useful these measures must be practically applied. Some measures for prevention and control are applicable by the action of individuals alone; others will require action by government or by nonofficial organizations.

Great advances in knowledge concerning infectious diseases were made toward the close of the last century and provided the foundation for the application of measures which have prevented or greatly reduced a number of communicable diseases that have long afflicted mankind. Many of these communicable diseases are no longer numbered among the chief causes of death. Meanwhile, knowledge of the causes and of methods of diagnosing, treating, or controlling a number of other important diseases has steadily increased. New knowledge may be expected concerning the disorders of nutrition, diseases of the heart and arteries, cancer, disorders of the mind and personality, and other major causes of disability and death. Application of this knowledge in the interest of the public health will depend upon its practicability and the extent of public support.

Health departments should be responsive to public demand. The scope and policy of public health work at any given time will depend upon the state of medical, sanitary, and related sciences, and upon the readiness of the public to support their effective use. Any formulation of the scope and the general policies of public health work must, therefore, be in terms sufficiently broad to include expansions made possible by developments in these sciences and in public understanding of their social usefulness.

With these considerations in mind, the following general policies may be stated:

1. A health problem becomes one of public concern when, because of its nature and extent, its solution requires organized group action.
2. The responsibility of a community for public health involves procedures that are community-wide in their application (as in the case of sanitary measures) and those intended to conserve the health of individuals who, for any reason, are unable to command health protection at their own expense.
3. Public health service may properly include not only well recognized procedures, such as those of sanitation, vital statistics, the prevention and control of communicable diseases, and health education of individuals, but also:
   a. Needed services, unless otherwise provided, for individuals afflicted with certain conditions and diseases which have a wide preva-

lence, a high cost of treatment, and are amenable to organized effort, such as those already found practicable in the treatment under public auspices of mental disease, tuberculosis, cancer, pneumonia, and syphilis.

b. Such responsibility for other medical care of individuals as may be delegated by legislatively expressed public policy to the health department rather than to some other branch of government.

RESPONSIBILITY IN REGARD TO CARE OF THE SICK

Various forms of tax-supported medical care are in operation for needy persons in many communities by the action of local or state governments. These systems are expanding. Many professional societies and lay organizations are also undertaking plans for the provision of medical care on a prepayment or insurance basis for self-supporting persons of small means.

Included among the obligations of the medical officer of health to the community is that he inform himself as to the facilities for the general care of the sick, their character and distribution, and that he make use of his position to see to it that any important inadequacies are corrected by appropriate action.

We believe that health officers should participate with other governmental and with voluntary bodies, particularly the medical profession, in planning for the improvement, coördination, and extension of medical facilities and services. Diagnostic facilities, treatment, and individual instruction in personal hygiene, through medical conferences and visits by public health nurses, should be provided by health departments for all persons needing such services and not in position to obtain them under conditions which make their general utilization reasonably probable.

HEALTH DEPARTMENT AS A LEADER FOR ALL COMMUNITY HEALTH WORK

It is believed that a comprehensive and well coördinated public health program in any local community or state can exist only when the health department assumes the leadership in public health administration. The health officer is properly held responsible for the performance of such functions as are necessary to secure the maximum of health and longevity of which the people of his community are capable. This does not imply that all services for the protection and promotion of public health must be carried on as official health functions, but rather that the department shall recognize the need of services, participate in the planning, and insure the coördination of activities carried on by other agencies, official and voluntary, in an adequate plan of health service applicable to the entire community.

III.

Essential Local Public Health Services

A modest but adequate health program for the people of North America can be guaranteed if the following basic principles of work are observed.

For all official health organizations operated under federal, state, or local authority, leadership and responsibility should be vested in a full-time trained health officer appointed on professional qualifications and secure against political interference or dismissal during competent performance; he should receive a salary equivalent to the net income of physicians or other professional men of equal training, and commensurate with the public responsibilities placed upon him; he should not engage in any other gainful occupation inconsistent with the proper conduct of his

office and should be required to give his whole time to its duties; annual appropriation for official health work totalling at least $1.00 per capita of population served should be provided for the minimum activities hereafter described, and exclusive of medical care and hospital services; freedom for the health officer to select trained personnel for medical, nursing, sanitary, laboratory, and statistical activities from lists of persons of proved competence should be assured.

There should be in every state (or province) or city, a board of health or public health council serving (preferably without pay), to advise with the health officer and determine the general policies of the health department. The same principle is probably applicable in smaller local units, counties, or rural health districts.

This body should include physicians, members of other appropriate professions, and representatives of the general public.

The state, city, or other local health officer should be directly responsible either to his board of health, or to the chief executive of the governmental area concerned.

With such leadership and resources there should be undertaken a program of local health department activities which will include at least the following six primary functions of modern health departments, which should be directed by full-time trained experts responsible to the health officer, except where the organization is too small to justify such desirable specialization of personnel.

LOCAL HEALTH DEPARTMENT FUNCTIONS

A. *Vital Statistics:*

The collection, tabulation, analysis, interpretation, and publication of reports of births, deaths, and notifiable disease. This, the first public function upon which all competent planning for health protection is based, is no more than the official bookkeeping of the human family within the political or governmental unit.

B. *Sanitation:*

The control of the material environment of man in the interest of human survival, comfort, and use.

The specific responsibilities in this respect include:

1. Safeguarding all water supplies, both public and private, commercial and household, so that the purity of the water for dietary, cleansing, or recreational use may be universal.
2. Securing the sanitary disposal of human and industrial wastes in a manner to avoid nuisance, and prevent the pollution of foods or water supply.
3. Supervision of the production and distribution of milk, and milk products, by licensing, inspection, and laboratory tests, to prevent the sale of any but a clean, wholesome pasteurized milk of standard food value.
4. Supervision of the production, processing, and distribution of foodstuffs, including shellfish, and of drugs and devices offered to the public for treatment of sickness.
5. Supervision of all places of human habitation to secure adequate light, air, water, sanitary necessities, protection from inclemencies of weather, and to prevent overcrowding of occupants. Also control over the environmental sanitation of public camp sites, swimming pools, bathing beaches, parks, and other public properties.
6. Control of mosquitoes, other insects, rats, and other vermin, such as may affect the public health.
7. Control over the environmental conditions of employment.
8. Control over atmospheric pollution by smoke, dust, and harmful fumes.

C. *Control of Communicable Diseases:*

Communicable disease control has always been and continues to be a basic activity of public health service. Health departments will fall in the confidence of the general public if they fail to prevent epidemics of certain communicable diseases. Practical application still lags far behind definite knowledge already attained which would enable physicians, public health authorities, and an enlightened public, working intelligently together, to make much greater progress in the control of many communicable diseases and to eradicate others as public health problems.

Specific responsibilities of the health departments include provision for the reporting of cases, the isolation of patients, and immunization of susceptible persons.

With regard to tuberculosis, syphilis, gonorrhea, malaria, hookworm disease, and epidemic diarrheas, there must be also systematic effort to find cases of infection not yet the subject of official report, and responsibility to provide diagnostic, consultative, and treatment facilities where necessary, and particularly for tuberculosis, x-ray service for diagnosis and review of progress, and sanatorium care.

D. *Laboratory Service:*

A well organized public health laboratory is one of the foundations of effective health work and is indispensable to an increasing degree for a wide variety of correlated public health functions.

Specific responsibilities of health departments include the building up and maintaining of a laboratory service which will provide assistance to practising physicians and departments of health in the diagnosis of communicable disease. Such a laboratory will be an important factor in stimulating friendly relations between physicians and the health department providing an expeditious and reliable diagnostic service. Control of foods and many other features of general sanitation depend for their effectiveness upon the skills and technics of the public health laboratory.

E. *Protection of Health in Maternity, Infancy, and Childhood:*

Beginning in social concern with the health status of the man and woman preparing for marriage, and continuing with supervision over the health of the expectant mother and carrying on with the protection of health of the new-born, the infant, the preschool and school child, and finally supervising the conditions of work and the fitness to work of young people even to the age of 18 years in some states, the health department deals with the important problems of human reproduction, growth, and development. Efficient conduct of services for the safeguarding of the health of mothers and young children materially reduces the burden of activities intended to control tuberculosis, syphilis, and other communicable diseases.

Whether school health service is provided by the department of health or by the educational authorities of the community, there should be formal provision for collaboration between these two departments of civil government to avoid duplication of services and conflict of authority.

F. *Public Health Education:*

Modern public health practice has shown how to prevent a large proportion of sickness and premature deaths. It is a responsibility of health departments to make this knowledge accessible to the average man, in a form that he can understand and make a part of his living. This may be accomplished through such channels as general newspaper or magazine publicity and per-

sonal effort with individuals by public health nurses and other professional and lay staffs, the distribution and publication of books and pamphlets dealing with subjects of personal and community health, through lectures, personal and group demonstrations, using lay and professional staffs, through pictures and exhibitions, the film, and the radio.

Many fields of preventive medicine can be cultivated, and effective progress made, chiefly or only after the public concerned have learned what they themselves can and must do in their own interest and through the services of the physician of their choice or through community agencies. Such campaigns of education as have been effective against tuberculosis, diphtheria, and syphilis, where official control is of great importance, have their counterparts in efforts to teach the people all of the facts they can understand about cancer, diabetes, heart diseases, nutritional diseases, occupational diseases, some diseases of mentality or personality, and especially about the care of the expectant mother and of young children. The public should understand both the extent of effectiveness and the limitations of modern medical, sanitary, and related science.

PUBLIC HEALTH NURSING

Throughout the work of the department of health in communicable disease control, in maternity and child hygiene, in public health education, and, in many rural areas, also much of the work for sanitation, depends for its effectiveness upon the services of public health nurses professionally directed.

Public health nurses, qualified to meet the standards of their profession, contribute materially to the work of each division in which they are engaged. In communicable disease control and in giving advice about food, rest, and health of children, their services are effective and are welcomed. They interpret the directions of the family physicians and of the physician of the health department. Their organizing ability for community projects and coöperation can be relied upon.

RESEARCH

Maintenance of essential health services at a high level, and assurance of improvement in the critical analysis of all that is done in the public interest require that some of the time and attention of the personnel of each major division or activity of every health department be devoted to inquiry and research so that the health department will be a source of new and accurate knowledge of preventive medicine and public health practice as well as the agency through which long established facts of science are made practically effective.

RELATION OF PRIVATE PHYSICIANS TO PUBLIC HEALTH

The employment of a competent family physician to guide the household in health as in sickness is the best investment the private individual can make for health. Physicians in private practice are the major reliance of our people in the care of disease, and can be of essential service to their patients in applying the principles of preventive medicine to personal service. The public should be encouraged to demand and pay for preventive service from their private physicians.

Health departments should include in their educational programs efforts to develop a demand for preventive services rendered by private physicians. Participation by all private physicians in procedures of a personal and clinical nature recommended by the health department is indispensable in the interest of the health of the community.

Health departments should also be prepared to accept responsibility for

planning or for supplying needed preventive services for persons who are not able to pay for them on an individual basis.

In deciding whether a given health procedure should be conducted by the department of health directly or by individual medical practitioners or other agencies, the primary consideration should be the welfare of the community. Relative cost, relative efficiency, and the practicability of adequate supervision must be considered. Where these factors are reasonably equal, preference should be given to a program which decentralizes health procedures so as to enlist the private practitioner in their application.

IV.

State and National Health Services

Complementary to the proper activities of local health departments are the health functions of state and national government.

State health functions include at least the following:

1. Coördination and technical supervision of local health activities.
2. Financial aid to local health departments as required.
3. Establishment and enforcement of minimum standards of performance of work of health departments, particularly in respect to communities receiving state aid for public health.
4. Enactment of regulations dealing with sanitation, disease control, and public health, which have the force of law throughout the state.
5. Collection, tabulation, and publication of vital statistics for each important political or health administrative unit of the state and for the state as a whole.
6. Collection and distribution of information concerning preventable diseases throughout the state.
7. Maintenance of safe quality of water supplies and controlling the character of the disposal of human waste for all communities of the state.
8. Establishment and enforcement of minimum sanitary standards for milk supplies.
9. Prescription of qualifications for certain public health personnel.
10. Maintenance of a central, and where necessary branch, laboratories for the standard functions of diagnostic, sanitary, and chemical examinations; production of therapeutic and prophylactic preparations, and their free distribution for public health purposes; establishment of standards for the conduct of diagnostic laboratories throughout the state; laboratory research in the causes and means of control of preventable diseases.

National, as distinct from state and local, health functions include at least the following:

1. Study of national health problems and planning of their solution as may be necessary on a national scale.
2. Meeting obligations under international treaties.
3. Control of communicable diseases in international and interstate commerce.
4. Administration of medical and health services on national property and for certain classes of federal employees.
5. Discovery of the causes and means of control of disease through organized research.
6. Sanitary control of interstate traffic and common carriers.
7. Control of foods and drugs in interstate commerce.
8. Assistance to states, and through the states to local areas, in the extension or improvement of their health services. This assistance may

be either technical or financial, or both, as circumstances may require.

9. Central collection, tabulation, and publication of vital statistics of the various component political units (states or provinces, cities and rural areas).
10. Establishment of standards of control of manufacture and sale of biological products used in the treatment of disease.

RELATIONS OF STATE AND LOCAL SERVICE

The Association believes that local authorities should assume the primary responsibility for carrying out the program here recommended since the major part of direct service to people can be most efficiently and economically rendered on a community basis. A permanent, efficient, and economic solution of health administration on a state-wide basis can come only through the organization of local (city, county, or district) health departments serving communities of sufficient size to make possible the employment of competent, technically trained executives who are responsible for the development of a sound comprehensive program, and who devote their whole time and energies to public health work. Such a department should include the medical, nursing, engineering, laboratory, inspectorial, and clerical personnel necessary to carry on a complete program.

STATE AID FOR LOCAL HEALTH SERVICES

Public health is a primary responsibility of each local community, but it is indispensable that there be authority vested in the state department of health to assure people of all communities that the health in some of them will not be jeopardized by the inertia, incompetence, or neglect of local government in others.

Furthermore, public health problems are usually more than local and there is wide divergence in the ability of local communities to meet the cost of adequate health programs, and, since in certain fields there is need of the assistance and guidance from highly trained staffs, the Association believes that the development of adequate public health services throughout the country depends upon state health departments being equipped to stimulate and advise regarding local health work and to give a substantial amount of direct financial aid when necessary to such work.

NATIONAL AID TO THE STATES AND LOCALITIES

Wide divergence exists among the states as well as within the states in economic resources and in available medical facilities. These and other reasons form the basis for the recently adopted policies of financial and professional aid to the states from the federal government for organizing and maintaining public health services where needed, and for assistance in the education of professional personnel. Health services under state laws and local ordinances should maintain, as they do at present, the principle of the primary state and local responsibility for administration.

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MEDICAL PREPAREDNESS

THE session of the American Medical Association, held June 10–14, in New York, was notable in many ways. It was certainly the largest gathering of physicians by some 2,500 that the Association has ever attracted. There was an unusual unanimity and singleness of purpose manifested throughout but overshadowing was the war in Europe, its consequences to us in this country, and the possibility of our becoming involved, to an extent which made everyone feel the necessity of marshalling the medical forces for a program of preparedness.

Not only did the meeting speak for the doctors of the country in a promise to serve under the government if occasion arose, but a resolution on Medical Preparedness was submitted for the Board of Trustees, passed unanimously, and a committee appointed. This resolution properly recognized that only the medical profession could select men physically fit for service in the military, naval, aviation, and veteran administrations, and that the rehabilitation of those not physically fit could be carried out only by the medical profession. In addition, the necessity of the services of the medical profession, for industrial workers, medical care of the civilian population, and the education of young men for the medical profession was emphasized. Further, attention was called to the vast amount of information held in the offices of the American Medical Association, such as complete records of all qualified physicians in the country, information concerning facilities for medical education, the hospitals of the United States, and the machinery for making contacts with doctors and medical agencies throughout the country.

Since the American Medical Association is the only organization which has all of this material at hand, the Board of Trustees was authorized to create a Committee on Medical Preparedness consisting of 5 officers of the Association ex officio, and 10 members of the House of Delegates. This committee was authorized and instructed to " establish and maintain contact and suitable relationship with all governmental agencies concerned with the prevention of disease and the care of the sick, in both civil and military aspects, so as to make available at the earliest possible moment every facility that the American Medical Association can offer for the health and safety of the American people and the maintenance of American democracy."

In addition to this, the *Journal of the American Medical Association* established a new Section on Medical Preparedness, wherein the activities of this committee will be noted and official announcements from the various departments of the government will be published.

Another significant movement was the presentation by Colonel C. G. Dunham of a tentative plan for building up the personnel of the Medical Corps of the Army in the event of an emergency. According to this the American Medical Association was to conduct a survey of the medical profession, covering the entire country, utilizing the local and county societies. The state societies were to maintain an available roster of their members and the American Medical Association was to maintain a numerical roster of availability by states. One or more medical officers of the Army were to be on duty at the headquarters of the American Medical Association in Chicago, and the War Department, corps areas or regional officers were to call on the American Medical Association for medical men as required. There were features with which the Reference Committee of the Association could not agree, though they endorsed the principles advanced. In general it was felt that in the choice of personnel for special services each physician capable of rendering service be allowed to offer himself to the government, and that there should be no arbitrary selection as advocated, but that membership in well recognized scientific specialty organizations, hospital appointments, and similar qualifications should also be considered.

At the beginning of the World War the regular Medical Corps of the Army numbered only a few hundred, something like 33,000 doctors throughout the country volunteered, while some 30,000 saw active duty, and there is no doubt that in any similar emergency the medical men of the country can be counted upon again to offer their services promptly and freely. There can, however, be no question of the importance of preparation and proper organization, as during the World War there were many inequalities, injustices, and misfits.

No one doubts that the public health personnel of the country not included in the medical profession will volunteer as promptly and freely as they and medical men did in the World War, and will do in any possible emergency. For them also, however, preparedness and organization are as necessary as for the doctors. A pronouncement on the matter can be confidently expected in the near future.

THE GOVERNMENT AND MENTAL HYGIENE

IN 1938, in the Report of the Surgeon General of the Public Health Service, attention was called to the increasing importance of mental and nervous diseases and epilepsy, and to the fact that while millions of dollars were spent annually for the care and treatment of such patients, there was being done very little fundamental research which might possibly assist in dealing with the problem by increasing the effectiveness of measures for prevention and cure. At that time the establishment of an institute for the study of nervous and malignant diseases was recommended.

In the 1939 Annual Report the idea is taken up again and after a study of existing facilities and the problems to be solved, it is suggested that an institute with 350,000 cubic feet of laboratory space for fundamental research be provided, together with access to 200 patients for clinical and laboratory work.

It is proposed by the Surgeon General [1] to establish a National Neuropsy-

chiatric Institute modeled on the plan of the National Cancer Institute. Attention is called to the fact that hospitals for mental diseases have on their books more than 500,000 patients and, in addition to this, there are 117,000 patients in hospitals for mental defectives and epileptics. Owing to the increase in life expectancy there will be a corresponding increase in the total number of mental disease cases in the older groups as the incidence in the age group over 65 years is ten times that of the group 19 years and under, and for this reason provisions against this should be made as soon as possible.

Recent developments have shown the influence of certain vitamins in relieving cases of insanity which have not heretofore been recognized as being of dietary origin, and this opens a new field of research with very inviting possibilities. Psychiatrists are inclined to believe that constitutional and metabolic factors may play a rôle in certain types of insanity which up to this time have been believed to be of psychic origin. Insulin shock treatment has come into use in one form of mental disease and there are many indications pointing to the importance of physiological research in respect to mental and nervous disorders.

It is proposed to build the Neuropsychiatric Institute on the present site of the New York Marine Hospital which would have the advantage of giving the staff access to patients and library facilities in the City of New York. In addition to this, it is suggested that there should be funds available for allotment to competent groups in different parts of the country for research on the problems of nervous and mental diseases and epilepsy. A National Advisory Council similar to that provided for Cancer is also recommended.

REFERENCE

1. A National Neuropsychiatric Institute, *Science* Supplement, Vol. 91, Jan. 12, 1940, p. 8.

THE INJECTION OF BIOLOGICAL PREPARATIONS

THE use of biological preparations, especially when introduced with a hypodermic syringe, carries with it many responsibilities and always a certain amount of danger. Pasteur's saying that a pinprick may open the door to death is still true. In addition to the procedure, the material itself, either through faulty preparation or poor handling, may carry with it infection. However, in spite of the millions of injections of many preparations given by all sorts and kinds of doctors who are supposed to have had proper training, in addition to all sorts and kinds of people without any training, accidents have been very few.

The most recent involves a case which is "probably unique in the medicolegal sense as well as scientifically." Briefly, a number of children after immunization against diphtheria with toxoid-antitoxin floccules (T.A.F.) became infected with tuberculosis, and the question arose as to whether it was due to an error in manufacture, substitution, accidental contamination of the material, improper handling, or other sources.[1] We have only now come into possession of the results of the studies made in clearing up the matter,[2] carried out by two well known professors, one in Ireland, where the accident happened, and one in England, with the senior bacteriologist of the laboratories which prepared the T.A.F.

Among the possibilities considered were: (1) accidental contamination during the preparation of the T.A.F.; (2) accidental substitution of living tubercle bacilli for the T.A.F.; (3) the contamination of the material at the time of injection through poor sterilization of syringes and needles, infection subsequent

to sterilization, and infection derived from the person inoculated. In this country all of our biologicals are issued under license from the National Institute of Health, the manufacturing laboratories are regularly inspected and constantly checked so that we have come to feel that all preparations issued under governmental authority are safe to use.

The English studies brought out some points often overlooked by the average physician and even by the average teacher of bacteriology, and carry suggestions for precautions not usually taken.

It was found that when 0.5 per cent of carbolic acid is used as a preservative, tubercle bacilli are killed in less than 7 days, and all pyogenic organisms in less than 24 hours, so even massive infection is guarded against by the time which usually elapses between preparation and use.

The syringes and needles are of great importance and are usually sterilized either by heat alone in the autoclave or by boiling in 0.5 per cent carbolic acid, for example. It is advised as an additional precaution that special syringes should be reserved for fluids which are bacteriologically "clean." Even drawing boiling oil into the barrel of the syringe does not kill spores. Alcohol with ether or ether alone, though widely depended upon, are poor disinfectants, and cannot be trusted to sterilize during the short time of action usually allowed. Where the syringe is used for multiple purposes and has contained an exudate or any such material high in protein, alcohol coagulates and perhaps sterilizes the surface, but protects microörganisms below the surface. It was concluded that the carrying of syringes or needles in containers of alcohol or ether is definitely unsafe even when separate syringes are used for inoculation and aspiration. In a few instances deaths from tetanus and gas gangrene have followed injections, but they are rare when compared to the many millions of injections given all over the world. During an investigation into deaths from the *Clostridium welchii,* living spores have been demonstrated in alcohol in which the syringes were stored.

Both syringes and needles may become contaminated by contact with hands, dressings, towels, or clothing, but there are two other methods generally overlooked; (1) droplet infection from the nose or throat; and (2) through improperly sterilized rubber caps.

We have for many years recognized the danger of droplet infection, especially in acute respiratory diseases, but the fact that syringes may be so infected has escaped notice of most of us. In 1938, Allison reported an instance in which of 70 nurses inoculated, 12 developed abscesses, all due to the same type of hemolytic streptococcus which was also isolated from the throat of the nurse who had charge of the boiled water which contained the needles and the syringes, the belief being that she infected the contents of the bowl by droplet infection. However, these studies showed that, when a droplet containing tubercle bacilli, not visible at a distance of 2 feet, was placed on the outer surface of the needle near the point and then inserted through a sterilized cap, the entire bottle became contaminated. Of 25 guinea pigs inoculated with this material, 5 died of intercurrent disease but the remaining 20 all showed extensive lesions of tuberculosis. Every cubic centimeter of the fluid in this bottle contained sufficient tubercle bacilli to cause progressive tuberculosis in guinea pigs. It was shown also that, where two or more syringes and needles were used for each bottle, only the first needle having been infected and the syringes being certainly sterile, a single dirty needle could contaminate the entire contents of a bottle.

The widely used rubber cap waxed by dipping into melted paraffin at 126–130° C. is not invariably sterile, though in all the tests made, the ordinary contaminating organisms were dead within 7–12 days. It is often assumed and has been stated that slight contamination on the outside of a needle could be wiped off through passage into the rubber cap. This was definitely shown to be incorrect.

The doctor's bag not infrequently holds a collection of bottles containing samples of feces or sputum, dressings, biological products, etc. Leakage and possible seepage must be held in mind as the conditions produced closely corresponded with those carried out in these experiments.

The work of this notable group left one valuable suggestion for the assurance of complete sterilization, a method which has been routine practice in the hospital with which one investigator (J.W.B.) is connected. Batches of dressings are placed in a drum in the center of which is a test tube containing a dry mixture of fine manured garden soil and hay dust, holding both aerobic and anaerobic organisms. When the autoclave is opened, broth is added to this tube and incubated. Only when no growth occurs are the contents of all drums sterilized during the same exposure, released for use. A further suggestion is that the hospital autoclave should be under the regular supervision of the hospital bacteriologist.

The whole matter is of great importance not only on account of the accidents which are distressing to families and cause great anxiety and even loss of standing to the physicians in charge, but also because they are magnified by those who oppose scientific medicine as well as by the lay press, and so hamper progress.

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IS ONE GRADE OF MILK DESIRABLE?

GRADING of milk has been a successful sanitary procedure in this country for nearly half a century. The system began in 1893, when certified milk was originated as a much needed milk supply of superior hygienic quality. After 1911, when grading of all market milk was enforced in New York City, this method became more or less universal in our larger cities, and since the widespread adoption of the Standard Milk Ordinance of the United States Public Health Service, it has been put into effect in a large number of the smaller cities and rural communities.

There is no question that grading has been one of the important factors in helping to improve our market milk supplies. The higher grades, such as certified milk and Grade A pasteurized milk, have set the pace for all milk supplies, while the bonuses paid by milk companies for the superior grades have been an incentive to dairymen to produce constantly better milk.

Modern milk supplies in metropolitan areas have attained such a generally high quality that the question has been raised as to whether grading of milk in many of these communities may not now be outmoded. A considerable number of cities have provided legally, in fact, for only one grade of pasteurized market milk, although usually permitting the sale of raw or pasteurized certified milk. It is, of course, a fundamental sanitary principle that *all* milk should be properly pasteurized.

Of special interest is the recent action of the Board of Health of New York

City in adopting regulations for a single grade of general market milk, especially since this city was the pioneer in the establishment of the grading system. Effective on September 1, 1940, the former Grade A and Grade B pasteurized milks are superseded by one grade of pasteurized milk to be designated as "Approved." Certified milk, which accounts for somewhat less than one per cent of the total milk supply, may still be sold as such.

Standards for this new grade of milk are higher than those of the former Grade B, which comprised about 87 per cent of the total milk supply, but are lower than those of the former Grade A, which was purchased by some 12 per cent of the local citizens. Thus the bacteriological requirements for the new milk supply are 150,000 per cc. if pasteurized in the country and 400,000 per cc. if pasteurized in the city, in contrast to 100,000 per cc. and 200,000 per cc., respectively, for Grade A. After pasteurization, the standard is the same, 30,000 bacteria per cc. The cooling temperature for the "Approved" milk is 60°F, as against 50°F for the former Grade A, and the age limit for the sale of the new grade is 48 hours, instead of the 36 hours for Grade A. After September 1 all milk must be protected with the cover cap, formerly used only for all Grade A and for Vitamin D milk of the B grade. The minimum butter fat is set at 3.3 per cent.

Whether the new regulations for milk in New York City are an improvement or not is a matter that has aroused much controversy. Despite the somewhat intemperate remarks on the subject by politically-minded bureaucrats, there seems to be no question that Grade A milk was, in general, better than Grade B, although the margin of superiority was not as great as the milk companies were often wont to claim. On the other hand, standards for the bulk of the milk supply have been raised, so that the majority should get better milk than in the past. Persons who want an even better milk apparently will have to buy certified, unless permission is granted for the sale of higher quality milks under special labels. There is no valid reason why such authority, properly safeguarded, should not be granted.

If it seems expedient to adopt a single grade of milk in a community, a wise principle might be to adopt with it the highest standards for milk that have been previously enforced, rather than intermediate standards.

J. G. FITZGERALD, M.D.

IN the death of Dr. FitzGerald, on June 20, 1940, in his fifty-eighth year Canada lost one of its eminent citizens and also an international figure in the field of preventive medicine.

After graduation from the University of Toronto in 1903, Dr. FitzGerald studied in the United States at Harvard University and at the Institut Pasteur in Paris and Brussels. He was appointed Associate Professor of Hygiene at the University of Toronto in 1913. To the University authorities he outlined his plan for research in hygiene and preventive medicine and for the preparation of sera and vaccines of proven value for use in Canada. He initiated the production of diphtheria antitoxin at his own expense. On May 1, 1914, his Antitoxin Laboratory became an officially recognized organization within the Department of Hygiene and Preventive Medicine of the Faculty of Medicine of the University. He was appointed director. From this modest beginning the Connaught Labo-

ratories came into being. Through the plans he laid, this institution has remained unique in that within the provincial university and under the control of a special committee of the Board of Governors facilities for research in preventive medicine in its broad sense are afforded and supported through the production of biological products.

Immediately upon the outbreak of war in 1914 the laboratories were able to meet the urgent needs of the Canadian and Imperial armies. Dr. FitzGerald served as major in command of a mobile laboratory in France and later as assistant adviser to the Fifth British Army. On his return he became Professor of Hygiene and Preventive Medicine at the University of Toronto. In 1922 he served as Professor of Bacteriology and Experimental Pathology at the University of California. In 1924 plans were completed for the establishment of a School of Hygiene in the University of Toronto to serve primarily as a center for teaching of postgraduate students. Through the generosity of the Rockefeller Foundation, funds for the erection of the school were provided. In the new building certain sections of the Connaught Laboratories were accommodated, and Dr. FitzGerald became Director of the school, at the same time continuing as Director of the Connaught Laboratories and as head of the Department of Hygiene and Preventive Medicine, Faculty of Medicine. He was appointed dean of the Faculty in 1932 and held this office for four years.

Dr. FitzGerald's ability and judgment were soon recognized and applied to international affairs. In 1923 he was appointed a member of the International Health Division of the Rockefeller Foundation, and continued in this position until 1931, when he was named as a Scientific Director of the International Health Division, and served for two terms of 3 years. In 1927 he represented Canada at the International Rabies Conference in Paris. He served as a member of the Health Committee of the League of Nations from 1930 to 1936, being vice-president in 1933. He was appointed a member of the Permanent Commission on Biological Standardization of the Health Organization in 1933. In 1933 he made a survey of health conditions in India, Ceylon, and Egypt in association with General F. F. Russell and Sir W. Jameson. He was invited in 1935, by the Rockefeller Foundation, to make a survey of the teaching of that subject to medical undergraduates. With Dr. C. E. Smith of Stanford University, he visited the leading medical centers in Canada, the United States, Great Britain and Ireland, and continental Europe, and made a comprehensive report.

To few are given the qualities of executive ability, singleness of purpose, imagination and vision, coupled with gentleness, modesty and charm of character in such large measure as Dr. FitzGerald possessed. He became a member of the A.P.H.A. in 1912, and a Fellow in 1924.

Credit Lines

A Selective Digest of Diversified Health Interests

D. B. Armstrong, M.D., and John Lentz, M.S.

On Taking Over

THOSE who knew the late Evart G. Routzahn intimately, as well as those who knew him only through the pages of this *Journal*, must realize the sense of responsibility that befalls the new editors on taking over this section. During the many years that Mr. Routzahn conducted this section he succeeded in giving it the unmistakable imprint of his warm personality as well as his characteristic prose style. This gained for him a wide and interested circle of readers. The new editors realize that those who may continue to follow these columns will hope to find the original flavor of the section preserved. Mr. Routzahn's particular knack for presenting health education in such a succinct and breezy fashion will be difficult to duplicate, but his characteristic "touch," even if inimitable, will be our inspiration.

As announced in the editorial columns of the August issue of the *Journal*, while this section henceforth will not be limited to comments pertaining to health education, yet readers may expect to find these interests holding sway over other items. Naturally we wish to serve Mr. Routzahn's readers and we venture to hope that others will find the broadened scope of this section useful to them. We shall welcome comments and criticism. Write us about any interesting projects that your department undertakes. Send us copies of pamphlets, posters, or other health education material that you may develop. Let us know what you would like this section to reflect. Tell us how we may present health information so that it may prove most helpful to you. It is by no means an easy task to telescope into a few pages the great volume of material that constantly flows from so many sources. Hence we look to you for a helping hand.

Evart G. Routzahn was a diligent pioneer in the field of health education and his comments in this *Journal* were a guiding influence for many workers in this profession. To carry on this section in much the same manner as it appeared under his editorship is one of the aims of the new editors of "Credit Lines."

A.M.A EXHIBITS

The Scientific Exhibit, an annual feature of the conventions of the American Medical Association, was viewed by thousands of physicians and representatives of related professions during the recent meeting in New York City. No one who witnessed the 1940 array of exhibits could fail to be impressed by the fact that it constituted a remarkable demonstration of the amount and variety of research and of professional education that are being undertaken under all kinds of medical auspices today. The exhibit particularly reflected the serious and exhaustive

inquiries into the mysteries of medicine that are being made by private practitioners and by voluntary groups of medical men. It emphasized the great effort to enhance precision and utility as regards diagnosis and treatment in the many fields of specialization. The keen study given the exhibits by the thousands of professional visitors was another most encouraging sign.

Critics of medicine have classified it as a sordid trade or a moribund science —characterizations with which all would disagree who had the privilege of seeing the manifest growth, vitality, and scientific integrity evidenced by the Scientific Exhibit at the 1940 and previous conventions of the American Medical Association. The threats of litigation and regimentation in medicine are unimportant and transient when measured against the long-time and far-reaching significance of this demonstration of medicine's perpetual search for truth in its service to mankind.

SOME THOUGHTS ON POSTERS

A poster designer recently gave a "shop talk" on his specialty in which some fresh and original comments were made. Health educators might find it useful to remember his definition of a poster. A poster, according to this authority, is an advertisement that exploits a complete situation with true sincerity in a split second—it is a one act play for presentation to a five second audience.

It seems to us that the experts in this line of publicity have "turned the trick" chiefly because they have succeeded in making long stories short. That is to say, they generally use no more than half a dozen words to tell a story or convey a message. Accompanying the brief text one generally notes a highly appropriate type of illustration. Throughout the poster there is an effective use of color both in the illustration and the lettering. Result: posters that are powerful eye catchers . . . posters which, if looked at only for a fleeting moment, tell a complete story.

The authority in his "shop talk" also emphasized the fact that the text to be used on a poster should be boiled down to a minimum, as the general public prefers to get its information in capsule form. At the same time, however, the poster must be made so attractive and entertaining that it will trap attention for a brief interval and release it with a concrete impression of what the sponsor wants to put over. Other points to remember in connection with poster design were discussed and the following may be helpful in connection with the planning of health posters:

1. Refrain from the use of blatant colors—do not try to rival the red, white, and blue "splash" of the circus poster.
2. Use restraint and good taste, and, above all, simplicity.
3. Do not clutter up the poster with a hodgepodge of ideas and illustrations.

Incidentally: the American Society for the Control of Cancer is now sponsoring a contest for a series of posters to be used in the Society's educational program throughout the country. It will be interesting to note whether or not the prize winning posters embody the principles of modern poster design. If any of our readers are interested in this contest, they may secure further information by writing to the American Society for the Control of Cancer, 350 Madison Avenue, New York, N. Y. The contest closes October 12.

A HEALTH EDUCATION LIBRARY

The July issue of the *Bulletin of the National Tuberculosis Association* lists 5 books on health education which are so replete with information that the *Bulletin* asserts that answers can be found to "most of the questions that anyone can ask as to the 'how' and 'what' of health education."

Here are the books that are recommended:

Principles of Health Education, by C. E. Turner, Dr.P.H., Professor of Biology and Public Health, Massachusetts Institute of Technology. 2nd ed. Published by D. C. Heath and Company, Boston.

Community Health Organization, edited by Ira V. Hiscock, Sc.D., Professor of Public Health, Yale University School of Medicine. 3rd ed. Published by the Commonwealth Fund, New York.

Ways to Community Health Education, by Ira V. Hiscock, Sc.D., in collaboration with Mary P. Connolly, Detroit Department of Health; Marjorie Delavan, Michigan Department of Health; Raymond S. Patterson, Ph.D., John Hancock Life Insurance Company; and William H. F. Warten, M.D., Baltimore Department of Health. 3rd ed. Published by the Commonwealth Fund, New York.

Your Community, Its Provision for Health, Education, Safety and Welfare, by Joanna C. Colcord, Director, Charity Organization Department, Russell Sage Foundation. Published by Russell Sage Foundation, New York.

Education for Health, A Study of Programs for Adults, by Frank Ernest Hill. Published by the American Association for Adult Education.

An up-to-date library is almost indispensable to the health educator, since the scope of his work is constantly being broadened. It is essential for workers in this specialty to have access to the latest literature in the field. How many of these books are in your library?

MAGAZINE ARTICLES

Readers of this section will recall that under Mr. Routzahn's editorship articles from current popular magazines on health or of medical import were listed each month. Many health educators undoubtedly found this a helpful feature, and "Credit Lines" will continue to list this material. Sometimes these articles may lack the degree of precision and accuracy that is desired in all health information, but the manner of presentation is generally lively and stimulating. Moreover, the style reflects some of the best talent in the journalistic field now devoted to popular expositions of scientific topics. It would be wise for health educators to read and evaluate these articles, for sooner or later someone will probably ask: "Did you see such and such an article in *Collier's?* or *Life?* or *Time?* or the *Saturday Evening Post?* What did you think of it? Is it true what this or that article said about the new five day treatment for syphilis?" and so on.

Much of the appeal of these popular articles, aside from the reader interest, is found in the attractive illustrations that accompany the text.

The following magazine articles, although not necessarily recommended, and not presented as a complete list, are worthy of your attention:

"T.B." Helena Huntington Smith. *McCall's,* New York, N. Y. May, 1940.

"Black Magic and Men in White." R. C. Gill. *Saturday Evening Post,* Philadelphia, Pa. June 29, 1940.

"Vitamins Are an Industry." *Printer's Ink Monthly,* New York, N. Y. May, 1940.

"To Test a Baby." Avis Carlson. *Atlantic Monthly,* Boston, Mass. June, 1940.

"Films in Public Health." Alice V. Keliher. *Business Screen,* Chicago, Ill. Vol. 2, No. 6.

"Give the Patient a Break." Hugh Cabot. *American Magazine,* New York, N. Y. April, 1940.

"Allergy Is Where You Find It." Harry F. Swartz. *The American Mercury,* New York, N. Y. July, 1940.

"20th Century Conquerors of Disease" (in two parts). Dr. Edward F. Roberts. June and July, 1940, issues of the *Rockefeller Center Magazine.*

"Lifting the Shadow of Syphilis." Surgeon General Thomas Parran. *Scribner's Commentator,* New York, N. Y. August, 1940.

"We Are What We Eat." Victor Heiser. *Better Homes and Gardens,* Des Moines, Iowa. August, 1940.

"Dr. Will and Dr. Charlie." Edward M. Brecher. *Scribner's Commentator,* New York, N. Y. July, 1940.

As articles of this type appear each month, it might be worth while to discuss them at staff meetings. Inaccurate articles or articles containing misleading statements should be singled out for

criticism by writing to the publisher or editor of the magazine concerned. Vigorous protest might lead to better scientific reporting. On the other hand, if articles appear that are well authenticated the editor or publisher of the magazine concerned should be commended. This would encourage publishers to print additional health or medical articles in their journals.

A NEW JOURNAL MAKES ITS BOW

Volume I, Number 1 of the *Quarterly Bulletin of Studies on Alcohol* made its appearance in June. This is the official publication of the Research Council on Problems of Alcohol, an organization which is now undertaking a research program to ascertain the facts about alcoholism and to make these facts known to the public.

The first issue of this new journal contains several noteworthy studies pertaining to the alcoholic psychoses and other aspects of alcoholism. The articles were contributed by distinguished scientists and their studies are presented in an interesting and scholarly manner.

Well worth reading in the first issue of this journal is an article by Dr. Abraham Myerson, entitled "Alcohol: A Study of Social Ambivalence." Here are some of Dr. Myerson's observations: "The problem of alcoholism is a serious one. No drug addiction that we know of is as important in western civilization. The amount of social damage done by alcoholism is enormous and if drinking is used as a way of escape, it is a futile one and overcostly. But even these facts, however widely they may be spread and to what extent they may be elaborated statistically, do not alter the fact that alcoholic beverages serve useful functions in society and that the moderate drinker shows no inferiority in any respect whatever to the total abstainer and in general he is probably a more personable fellow, easier to get along with, and having a better time out of life."

Continuing, Dr. Myerson says: "Alcohol is a sort of chemotherapy for undue stress, for the overdeveloped purpose, for the effect of those social organizing forces which often become too onerous. It releases exuberance, good fellowship, and friendliness, all of which are exceedingly valuable to man. The synthesis of temperance, of the wise use of alcoholic beverages, is a necessary part of the battle against alcoholism."

Dr. Myerson also points out that there must be no lessening of social control of the use of alcohol. The main road to the prevention of alcoholism is a personal temperate attitude that can be brought about by the development of a new and wise social tradition which may appropriately be labeled "enlightened hedonism," according to this authority.

A PHYSIOLOGIST LOOKS AT HEALTH EDUCATION

Dr. Anton J. Carlson, physiologist at the University of Chicago, makes many interesting observations on health education in an article which appeared in the January, 1940, issue of *The Scientific Monthly*.

Here are some of Dr. Carlson's thoughts on the subject:

> We are slowly realizing that at all stages of education the traditional "three R's" must be rounded out with an "h," which stands for, not hallelujah, but *Health*. And health education is more than the establishment of so-called health habits, like love for the toothbrush, fear and hatred for gin and whiskey. Education is more than habit formation, more than cerebral canalization to the centers for love and hate. Education means understanding. Health education means understanding the living body, the living machinery of man, the known causes of disease or ill health, and the known ways of keeping fit. This is the contribution of the medical sciences to primary and general

education in our democracy, as yet only partially either sensed or achieved. The imparting of the traditional three R's to youth is by the nature of the case largely a matter of dogma and drill. But drill and dogma are largely futile in health education. Health education cannot be achieved by the memory route, as can the alphabet, the multiplication table, or the church catechism. Health education involves the ABC's of science and the scientific method, both on the part of the teacher and the pupil, that is, controlled experimentation, rechecked observation, repeatedly verified cause and effect relations. It is the development of the skill in finding "facts," the use of reason based on facts rather than an exercise of faith based on unverified dogma.

TIME WILL TELL

Interesting predictions about the control of three important public health problems were recently made by R. A. Vonderlehr, M.D., Assistant Surgeon General of the U. S. Public Health Service, and Louis I. Dublin, Ph.D., Statistician of the Metropolitan Life Insurance Company.

In an interview Dr. Vonderlehr stated that he foresaw the control of syphilis within 25 years, provided that the existing federal services are maintained. He added that if the new five day treatment proves effective syphilis may yield to control in a shorter period—perhaps within 10 years. Dr. Vonderlehr also ventured to predict that gonorrhea will be stamped out in the United States in 5 years. He based his optimistic prediction upon the successful treatment of gonorrhea by means of new chemotherapeutic agents.

At the recent conference of the National Tuberculosis Association, Dr. Dublin forecast that tuberculosis could be "substantially eradicated" in this country by 1960.

Time will tell. Certainly it is interesting to have this "preview" of what the disease situation may be in the years that lie ahead.

RADIO TABOOS

Has public response to your radio programs been disappointing? Possibly you may be frightening many listeners away simply because your program happens to be listed as an educational program or a health lecture. According to the *New York Times*, new terms must be coined to supplant "education" and "lecture" for broadcasting purposes, as both words connote something dull or cut-and-dried to the mass of radio listeners. The educational programs produced by the National Broadcasting Company are called "public service presentations," while in England the term "popular talk" has taken the place of the word "lecture." Moreover, the *Times* maintains that the educational program must be "sugar-coated with music, drama, and showmanship if it is to become a tasty morsel for the ear."

Hints and Hunches

Educational Qualifications in Public Health—The educational qualifications recommended for health officers by the Committee on Professional Education of the American Public Health Association have been the subject of widespread editorial comment. Without exception the press has commended the committee for the high educational standards set. The *Journal of the American Medical Association* commented as follows:

These recommendations should have a definite value in educating the public to the necessity for having well trained men in charge of our public health activities. They should also tend to discourage the too frequent practice of appointing state and local health officers as a reward for political service

or on account of some personal friendship. Perhaps the most important feature of this pronouncement by the American Public Health Association is the clear recognition of the necessity for medical as well as scientific training.

Hay Fever and Taxes—The search for a hay fever cure goes on year after year. While medical science ponders the problem, a correspondent of the *New York Times* comes forward with a suggestion that a remedy lies in—of all things—taxation. Establish a special tax on all vacant lands that are not clear of noxious weeds. . . . Have the health commissioner enforce the law and impose a good sized additional tax when land is not cleared well in advance of the hay fever season. So writes the *Times* correspondent, who believes that if such laws are enforced the offending weeds would disappear within 24 hours and the hay fever with them. We await with interest the first treatise on Taxation as a Factor in the Control of Hay Fever.

Home Accidents—In 1938, home accidents ranked seventh as a cause of death in the United States, being exceeded only by deaths due to heart disease, cancer, cerebral hemorrhage, nephritis, pneumonia, and tuberculosis. In addition, home accidents resulted in more than one-half of all accidental injuries. The prevention of home accidents is, therefore, an activity which should demand the attention of all persons interested in public health.

In view of the opportunity which the visiting nurse has to observe equipment and living habits in American homes, the Metropolitan Life Insurance Company recently solicited the aid of its visiting nursing staff in a study of home accidents among its policy holders. This study is perhaps the most comprehensive of its kind to be undertaken in the home safety field, and it promises to disclose much valuable information. It is being conducted to obtain original data regarding types, causes and locations of home accidents, and also to give the company nurses a greater appreciation of the need for, and methods of, safety teaching in the homes of policy holders. Results of the study will be published at a later date.

Health Education Institute—The program for the forthcoming Health Education Institute, which was printed in the August issue of the *Journal*, indicates that this year's session will be as profitable from an educational standpoint as those of preceding years. The faculty has again been wisely selected. It concludes outstanding authorities in public health and related fields. Those who attend the Institute will no doubt profit enormously from the papers and discussions that are scheduled. New technics, new developments, and new ideas will be presented, from which health educators will draw inspiration. We note with considerable interest that this year's program provides time for a "get together." This should be one of the most stimulating events of the Institute, teeming with informal shop talk and enthusiastic conviviality.

Housing the American Museum of Health—The American Museum of Health will be permanently housed in a building that is now occupied by the "Masterpieces of Art" Exhibit at the New York World's Fair. The site of the Fair is to be converted into a public park at the close of the 1940 run and most of the exposition buildings are to be demolished. The City of New York, however, was recently offered several of the structures for park purposes and the "Masterpieces of Art" building was accepted by Mayor La Guardia to serve as the permanent home of the American Museum of Health. The building will form an ideal setting for

the exhibits in that it has many spacious rooms that are well lighted and free of architectural obstructions. The exhibits that are now being shown in the Medical and Public Health Building at the Fair will form the nucleus of the permanent display.

Gutenberg — Five hundred years ago, a man by the name of Johann Gutenberg gave to the world an art that has since served all the arts. In 1440, Gutenberg devised a successful method of casting metal type which made printing possible. Today we cannot conceive of a world functioning without the facilities and benefits of printing, for this art surpasses all others as a medium for promoting human progress and welfare. So much of the work that is done in the field of health education rests upon the printed word that it seemed we should, in these columns, pay tribute to Gutenberg for the indispensable service rendered to our profession through his invention of printing 500 years ago.

American Museum Advisory Service—The American Museum of Health has inaugurated an advisory service for the purpose of assisting individuals and organizations in the development of health education materials. This service is known as Aids in Health Education, and headquarters have been established in the Hall of Medical Science at the New York World's Fair. The staff of Aids in Health Education will gladly render assistance in connection with the preparation of literature, visual aids, and other health education media. Services of the staff may be secured either by a personal call at the Museum or through correspondence.

CATCH-ALL

Sulfapyridine is now being distributed free in 23 states . . . Surgeon-General Parran's recent paper on preparedness should be included on your "must" reading list (*J.A.M.A.*, July 6, pp. 49–51) . . . "Choose to Live," the latest film produced by the American Society for the Control of Cancer, is an expert job—compact, informative, and entertaining . . . It was announced at the recent Home Economics Convention in Cleveland that strawberries are as high in vitamin C content (ounce for ounce) as orange juice . . . The Metro-Goldwyn-Mayer film on the life of Madame Curie has been abandoned, much to the disappointment of public health workers who had eagerly awaited its release . . . A top-notch annual report is that of the Children's Aid Society of New York called "Children in the News" . . . A new series of postage stamps known as the "Science Series" will be issued shortly by the Post Office Department, each stamp to bear the likeness of a famed scientist. Dr. Walter Reed is the public health hero who has been listed for commemoration in this series . . . It is reported that the infantile paralysis virus is not killed by ordinary water chlorination. Thus swimming pools may yet prove to be a factor in the spread of this disease . . . New films in the health field will no doubt materialize soon. In certain quarters plans are under consideration for the production of a film on either nutrition or home safety . . . Do you ever read the book reviews in *The Quarterly Review of Biology?* We recommend them not only because they say "what's what" about a book, but also because of the humorous touches that are found in many of the reviews attributed to Reginald, the Office Boy. Reginald

has become one of our favorite critics . . . It is understood that some consideration is being given to a possible demonstration for the control of acute rheumatic fever and rheumatic heart disease in an area that may be selected in a prominent eastern state . . . In New York State diphtheria has almost reached the vanishing point. In 1925, in the upstate area there were 4,370 cases and 338 deaths, and a death rate of 6.4 per 100,000. In 1939, the rate was 0.16 per 100,000. In the first 4 months of 1940, in a population of over 6 million, there was 1 death, as compared with 3 in the same period last year!

Escape from Reality

THERE are innumerable varieties of escape from reality, and every normal person indulges in some of them. One would be unwise and narrow-minded to classify all of them as futile and pathologic. The enjoyment of poetry, art, drama, music, hobbies in general, even the proper use of alcohol—all of these are momentary and, up to a point, permissible diversions from the realities of life. But when they are used to the extent that we are less willing or less able promptly to return to reality, they had best be left alone for then they have become pathologic. This is true also of academic education. . . . — Excerpt from the report of the Neuro-Psychiatric Institute of the Hartford Retreat, Hartford, Conn., April 1, 1940.

BOOKS AND REPORTS

A History of Tropical Medicine—*By H. Harold Scott, C.M.G., M.D., F.R.C.P. Lond., D.P.H., D.T.M., and H. Camb., F.R.S.E. Baltimore: Williams & Wilkins,* 1939. 2 vols. 1,165 pp. Price, $12.50.

This extensive work by the Director of the Bureau of Hygiene and Tropical Diseases of the London School of Hygiene and Tropical Medicine is an expansion of the Fitzpatrick Lectures delivered before the Royal College of Physicians of London, 1937–1938. In the preface the author emphasizes the difficulty of defining tropical diseases, but in the two volumes he deals with most of the important diseases which usually originate or are more prevalent in warm climates. Certain noteworthy omissions, however, are rickettsial diseases; trematode diseases, especially schistosomiasis; the filariases; and bacillary dysentery.

The first four chapters deal with the medical problems of the British Navy and Mercantile Marine, the Army, and the outlying portions of the Empire. These are followed by long chapters on malaria, blackwater fever, yellow fever, and trypanosomiasis and shorter chapters on leishmaniasis, leprosy, cholera, and plague. Still briefer chapters deal with undulant fever, relapsing fever, melioidosis, dengue, amebiasis, hookworm, and the four avitaminoses, beriberi, epidemic dropsy, pellagra, and scurvy. Brief mention is made of akee poisoning and ginger paralysis. Chapters are devoted to the Suez Canal, Panama Canal, and the relation of slave trade to disease. Finally, brief biographies and photographs are presented of fifteen pioneers in tropical medicine. There is a brief bibliography and an extensive author and subject index.

The author shows evidence of having explored a tremendous amount of historical literature, citing or quoting, perhaps too extensively, many works little known to the average reader. He even gives the original and translation of passages from Greek and Latin authors. The arrangement of the material is not very logical, containing many digressions which make it difficult to follow the historical trend. The author gives evidence of great familiarity with the British Empire but is often inaccurate in his references to diseases and places in the New World. There are also a number of inaccuracies or omissions in the names and work of some American authors. The discussion of avitaminoses has not entirely been brought up even to the date of the Fitzpatrick Lectures. Despite the defects, which are perhaps excusable on the basis of the extent of the subject, the reviewer feels that this is a valuable contribution to medical history and should be widely used as a reference work in medical libraries and by individuals particularly interested in tropical medicine.

HENRY E. MELENEY

Health Is Wealth—*By Paul de Kruif. New York: Harcourt, Brace,* 1940. 246 pp. Price, $2.00.

This book gives the story of a fight for a national program of human conservation which originated informally with a small band of physicians and public health men in Detroit. It also gives rather intimate stories of the National Health Conference in 1938 and the hearings of the Wagner Bill in 1939, both of which the author says

were "misled by certain government and labor group visionaries and crackpots"—"pseudoscientists" who seemed to believe that public health could be served best by "snubbing and damning the doctors," who, he rightly says, are nevertheless "fundamentally the arbiters of life and death of the people."

Concerning Miss Roche's conference, the lay groups were "in general uncritically enthusiastic" and the sums proposed for medical care were "astronomical," with no plan for raising the money. It was insinuated that the American Medical Association was against all health programs yet this body had not been consulted either by Miss Roche or "her medical brain trust." Among those who held the American Medical Association in contempt were advocates of compulsory health insurance. Concerning compulsory health insurance there is mentioned an illustration by Basil O'Connor, a layman, who pointed out that we are concerned with the tremendous number of deaths and injuries due to motor traffic yet no one would regard compulsory motor accident insurance as the chief weapon in combating this loss.

There are many other things that we would like to quote. The author gives the story of appointments for meetings which came to nothing, snubs where consultation was the wise and fair thing. For example, when the Committee from the House of Delegates of the American Medical Association, appointed to coöperate with the government, got to Washington they were treated politely but were shown that this was "a hearing" and not a conference with them as equals. Soon after came the indictment of the 5 officials of the A.M.A., who were representing some 113,000 doctors in the country. The author asks if the people of the country for one minute believe that these 113,000 doctors were criminals.

One chapter, "Public Health is Good for the Doctors," physicians could well read, and the following chapter, "Public Health Needs the Doctors," is a good lesson for the layman. The whole book is a powerful plea for public health and shows that the medical profession of the country is not only interested in it but necessary to it.

One fallacy is quoted a number of times with approval, credited to Dr. Peet as a health slogan, "It costs us less to save 'em than to bury 'em." Needless to say, those who are saved in youth must be buried later, even if they live the full span of life, so that while the life of a human being has been estimated as having certain money value by economists, the question of burial does not come in one way or the other as an argument for saving them from illness or death.

The contents of this book have been published over 5 years in the *Country Gentleman* and a number of the chapters are substantially as they appeared in that journal. It is virile, entertaining, and contains much food for thought. The author is a propagandist and the book abounds in laudatory adjectives. "All our geese are swans."

MAZŸCK P. RAVENEL

International Vital Statistics, Vital Statistics—Special Reports, Vol. 9, No. 36—*Bureau of the Census, Department of Commerce, Washington,* May 2, 1940. 114 pp.

Under the foregoing title the Federal Bureau of the Census has issued a special report which is of particular interest and value at this time. The report gives for fifty-odd countries, population statistics and data which reflect the status or changes in the population, such as rates of birth, death, marriage, divorce, migration, and the like.

Among the more interesting population figures are the following, given in

millions as of 1936: Japan 70.2; Germany 67.3; Italy and colonies 43.0; France 41.9; England and Wales 40.8; Poland 34.0; Spain 25.0; Roumania 19.3; Czechoslovakia 15.2; Netherlands 8.5; Belgium 8.3; Sweden 6.2; Switzerland 4.2; Denmark 3.7; Ireland 3.0; and Norway 2.9.

Percentage change in population from 1921 to 1936 ranges from a decline of 4.2 per cent in Ireland to an increase of 76.6 per cent in Palestine. Other interesting rates of increase are Mexico 33.0 per cent; Canada 25.3 per cent; Japan 23.7 per cent; United States 18.7 per cent; Spain 16.4 per cent; Italy 13.2 per cent; Germany 8.6 per cent; England and Wales 7.8 per cent; and France 6.8 per cent.

Population densities per square kilometer (0.4 square mile) range from 0.9 in Australia to 825.3 in Malta and Gozo. In Belgium the density is 272.6 per square kilometer; England and Wales 270.3; Netherlands 258.9; Japan 189.4; Germany 143.1; Italy 138.6; France 76.1; and the United States 16.7.

The birth rates per 1,000 population in the various countries for 1936 are as follows: Japan 29.9; Italy 22.4; Germany 19.0; the United States 16.7; France 15.0; England and Wales 14.8; and Austria 13.1. There is also given a table showing the net-reproduction rates which take account of the number of women in the childbearing ages.

Standardized death rates in the 1930's are shown to vary from 6.9 per 1,000 population in New Zealand to 24.1 in British India. The rate for the United States, 10.8 is one or two points higher than the rate for most of the North European countries. Rates at ages vary more for the young than for the old.

There is also a table showing annual immigration, emigration, and net migratory gain or loss in the United States. The peak of population increase by this method (815,303) occurred in 1913. The largest decrease (112,786) was in 1932. Figures for the years 1934–1938 are of greatest interest. They are —13,268 for 1934; —9,329 for 1935; — 2,385 for 1936; +7,302 for 1937; and +30,083 for 1938.

Enough has been given in this brief preview to indicate that this report should form a most useful source of information for the internationally minded. The Bureau of the Census is to be congratulated on its production.

A. W. HEDRICH

Education of the Handicapped: Vol. II, Problems—*By Merle E. Frampton and Hugh Grant Rowell. Yonkers-on-Hudson, N. Y.: World Book Co.*, 1940. 443 pp. Price, $2.80.

This book is the second contribution on the Education of the Handicapped by Drs. Frampton and Rowell of the Division of the Handicapped, Teachers College, Columbia University.

The first section should prove of value to school administrators, directors of school health services, teachers, doctors, nurses, laymen interested in social problems, and a host of others. In five short chapters the authors have outlined some of the major problems in educating the handicapped. Through a discussion of the problems, a philosophy is developed for the reader that should clarify some of the sentimental and confused thinking that now exists in this field.

Heretofore, the problems of the handicapped have been presented piece-meal. The authors have accomplished much by discussing for us, in a general way, the total field of education of the handicapped. We now have a source that can be used to synthesize and crystallize the thinking of all workers with the handicapped or in related fields. Of course, many points made by the authors are debatable de-

pending on one's point of view and experience.

Of special merit are the two chapters dealing with the Psychological Problems and Problems of Economic Security. Each year, large sums are expended to discover the handicapped. Everything that would aid the handicapped individual to make his way in so-called "normal society" is tried. Special programs of treatment and education are developed to meet their needs; vocational guidance, training, and special rehabilitation work are planned for many. Finally, the young man or woman attempts to secure employment. The blank wall that is met is heartbreaking. One wonders why all the time, money, and effort were expended to fit the handicapped for their rightful place in "normal" society, when we definitely state by law and act that we cannot find a place for them in a productive society.

The second section deals with problems affecting each of the special handicapped groups. These cover the blind, the partially-sighted, the deaf, the hard-of-hearing, those with speech difficulties, the crippled, the undervitalized, cardiacs and tuberculous, those with cerebral palsy, the mentally handicapped, and the socially handicapped. This portion of the book should be of real interest to all educators, especially to those principals and teachers who do not have recourse to special teachers or consultants in the various areas, when confronted with a specific problem. Undergraduate and graduate students in education may find this section of value when seeking an area of specialization. School and private physicians, school nurses, and others engaged in the health guidance programs would profit by a study of the educational problems faced by each of the different types of handicaps. To understand and help people we must have an understanding of their background. This section fills just this need.

In the third and final section are presented some special problems that have been solved in actual practice. This is a small section and should have been expanded. However, the authors state that they plan to publish a series of books covering methods and activities for each of the special areas.

This book meets an expressed need and should aid materially in clarifying our thinking with regard to the handicapped. The authors have indicated the fields that need clarification and have placed special emphasis on the problems that demand further research. Objective research and experimentation can aid in the solution of these problems. S. F. LIFSON

The First Five Years of Life—The Preschool Years. *From The Yale Clinic of Child Development—By Arnold Gesell, Ph.D., M.D., Henry M. Halverson, Ph.D., Frances L. Ilg, M.D., Helen Thompson, Ph.D., Burton M. Castner, Ph.D., Louise Bates Ames, Ph.D., and Catherine S. Amatruda, M.D. New York: Harper,* 1940. 393 pp. Price, $3.50.

There is no book of which this reviewer is aware that gives a more complete picture of the normal growth and development of the preschool child in so compact a form as this latest volume by Arnold Gesell and his Associates in the Yale Clinic of Child Development.

The care with which the material has been selected out of twenty years of fundamental research is evident on every page. We have here not only the results of carefully planned scientific observations but also a philosophy and methods which should point the way to productive future studies. The task "is to get a better appreciation of the individual ways in which individual preschool children mature." We grasp the central concept of this illuminating vol-

ume when we realize in its own words that "The *total child* ceases to be an academic abstraction as soon as we try to ascertain the grouping of his behavior traits and the trends of his growth career."

The contributors to this volume have preserved a remarkable unity of purpose in presenting a great diversity of material. The scope of the work may be indicated by a few of the chapter headings: The Nature of Mental Growth; Motor Development; Adoptive Behavior; Language Development; Personal-Social Behavior; Individuality and Its Characterization; Developmental Supervision and The School Beginner.

This reviewer having a keen interest in photography is especially impressed with the pictorial illustrations covering twenty-one pages. A number of the "angle shots" actually speak for themselves. As. Dr. Gesell succinctly states, "Behavior has shape. . . . The camera captures the visible profiles of child behavior and gives us a great many hints of underlying attitudes, strivings, and satisfactions." The section on Examination Records and Arrangements should prove very helpful to all those actually interested in growth and development of preschool children. A list of 142 selected references completes the volume. Here is a book that cannot be too highly recommended.

RICHARD A. BOLT

Index to the Proceedings, Journal and Other Publications of the American Water Works Association, 1881–1939—*New York: American Water Works Association* (22 East 40th St.), 1940. 281 pp. Price, $2.00.

An excellent guide to material which has appeared in the American Water Works Association *Proceedings* and *Journal* from 1881 through 1939. The book is introduced to the reader by brief yet comprehensive instructions as to how to use the index. Technical topics are then listed with their respective page numbers and directly following each main topic are listed cross references. The topical subjects are printed in large, heavy-type caps—easy to find; the cross references are printed in small letters. Cross references are generously given and the standard method is used in listing papers. In the back of the book, there appears an author index and also a list of other publications issued by the American Water Works Association, where these publications are available, and the price of each. ARTHUR P. MILLER

Bibliograhy of Swimming—*Compiled by Frances A. Greenwood. New York: H. W. Wilson Co.*, 1940. 308 pp. Price, $4.25.

This bibliography of texts and articles on the swimming pool, its sanitation, etc., is a valuable product containing as it does 230 pages of references.

It is not to be considered as complete, however. For example, we find no reference to the 1937 Report of the Joint Committee on Swimming Pools and Other Bathing Places published in *Beach and Pool*. Of the bibliography cards on file in this office (Department of Health and Physical Education, University of Buffalo) approximately 20 per cent of the material published before 1939 does not appear in this Bibliography. This "before 1939" is set up arbitrarily as it is realized that a text of this sort naturally lags several months behind current publications.

CHARLES H. KEENE

We, the Parents—*By Sidonie Matsner Gruenberg. New York: Harper*, 1939. 296 pp. Price, $2.50.

Parents who would like to be scientific and serious minded about the business of child guidance, and yet be able to relax a little and enjoy their children

at the same time, will find this book an inspiration. The author having brought up her own family most successfully is unusually well qualified to advise other parents. She brings to her readers a seasoned point of view from her own experience in parenthood and from her many successful years as an educator.

Mrs. Gruenberg discusses with real wisdom such subjects as the following: influences of radio, movies, and so-called "bad" books on children; children and money; maintaining discipline with a minimum of punishment; how to discuss questions of birth, death, sex, and other similar subjects with children, naturally and simply.

In her own words, modern parents "want to know how to understand the nature of these children they are guiding. When, for instance, four year old Johnny pushes over his ten months' old sister who is just learning to walk, we no longer ask, 'How shall I punish him so that he won't do that again?' Our greater concern is not that Johnny is *causing* trouble, but that he is *in* trouble. We know that we have to help him out of it."

This book is highly recommended for parents, doctors, teachers, social workers, and all adults who wish to understand children better, and how to guide them more intelligently.

ETHEL GORDON

A Doctor's Holiday in Iran—*By Rosalie Slaughter Morton, M.D. New York: Funk & Wagnalls,* 1940. 335 pp. Price, $3.00.

This story is the result of two visits made to Iran by the author. It contains a great deal of history of this ancient country with word pictures of famous old cities, shrines, gardens, roads, bazaars, gems of architecture, etc. However, we are particularly interested in the chapters dealing with health.

The author says that the part played by doctors in the advance of Iran is far-reaching and important since the things which have so far held it back are in some way or other concerned with the lack of hygiene. Interesting pictures are given of the diseases which are most prevalent, and of the clinics which are so closely bound up with the work of missions that it is not easy to separate them. Medical missionaries have been chiefly responsible for the groundwork of modern living which is now found in Iran. With infinite patience they have taught the ways of the Western world and given to the Iranians a constantly increasing respect for Christianity and for Westerners. However, the wonderful work of these missionaries has been able to bear fruit chiefly through the vision and aid of the Shah Riza Pahlavi, who during his 14 years of rule has utilized every force for the advancement of his people. Although educational and medical work has been going on for something like 100 years, it is only during the last 10 or 12 years that it has reached its full flower, due to the influence of the present Shah.

The descriptions of the clinics are not only interesting but fill one with admiration for the competence, unselfishness, and devotion of the medical missionaries On the other hand, the description of the cases which present themselves are depressing. One cannot but admire the courage which enables these medical missionaries to carry on in their unfavorable surroundings and in face of the medical difficulties which they encounter. In spite of the great advance in education, there is still an enormous amount of superstition which leads not only to distinctly unhygienic measures, like blowing, spitting, and stroking to heal the sick, but to the use of charms which are without value.

The book is well written. The author has traveled widely in other

countries as well as in Iran. On the visits of which she now writes, she traveled some 3,300 miles, many of which were hard going, due to the bad roads and inferior cars. Naturally her interests related especially to the women of the country, who even more than the men, are realizing the benefits of modern customs since the present Shah has abolished the veil and opened a new world to those who have been for so many centuries suppressed. However, as the author says, the unveiling of women is only a part of what has been done, as general education has lifted from the peasant minds the veil of ignorance, modern medicine has removed the veil of disease, and the veil of spiritual bondage is being lifted.

We cannot but wonder if the author has not been a little bit carried away by what she has seen, and perhaps the glamour of this ancient country, for she asks, "If Iran, by idealism and force of will, is making great progress, what is our weakness, that we, with a background of open-mindedness and opportunity, are, by comparison, standing still?"

The book is well illustrated and full of interest. "Iran is a reborn nation, with a magnificent future awaiting her in which her ancient racial intelligence and imagination will still find keen expression, in modern terms."

MAZŸCK P. RAVENEL

Standard Methods of the Division of Laboratories and Research of the New York State Department of Health—*By Augustus B. Wadsworth, M.D. Baltimore: Williams & Wilkins,* 1939. 681 pp. Price, $7.50.

The second edition of the "Standard Methods" employed by the New York State public health laboratories follows the same general plan as the first in setting forth the methods in use in the various departments of the Division of Laboratories and Research; but includes some new material, chiefly in the form of recently adopted methods. There are, for example, a new quantitative technic for complement-fixation tests; a revised colloidal gold test; directions for the Neufeld method of typing pneumococci; directions for the production, concentration, and standardization of certain therapeutic antisera; a short section on the determination of hydrogen ion concentration, and a bibliography on quantitative chemical procedures. This work is the only comprehensive American publication in book form dealing entirely with public health laboratory technics, and covering the field adequately. It is a valuable reference book.

The section on "Methods used in the Antitoxin, Serum and Vaccine Laboratories" is especially useful since the material contained therein is not to be found elsewhere in such detailed and thorough, though concise, form.

WILLIAM D. STOVALL

Let's Talk about Your Baby—*By H. Kent Tenney, Jr., M.D. (2nd ed. rev.). Minneapolis: University of Minnesota Press,* 1940. 115 pp. Price, $1.00.

This little book appears in an attractive new dress as the second revised edition of suggestions which Dr. Tenney prepared originally for his private patients. It departs from the usual style of other manuals by putting into the mouth of the baby at the beginning of each chapter certain questions and statements which are answered conversationally in a very informal but practical manner in the latter part of the chapters.

The material taken up for discussion follows the usual lines of what mothers, and incidentally fathers, should know about the growth, development, and daily care of the normal baby. It contains at the end places for a record of the important events of early life and a convenient index. The book is easy

and delightful reading even for a reviewer through whose hands have passed many books of a similar nature. It should prove very helpful to mothers of young children and also save the busy physician many "night calls."

RICHARD A. BOLT

The Science of Psychology—*By Raymond H. Wheeler (2nd ed.). New York: Crowell,* 1940. 436 pp. Price, $2.75.

This book is a revision of a text in elementary psychology written for college students ten years ago by Dr. Wheeler, who has been a follower of the Gestalt School of Psychology for many years. The arrangement of the book and the style of the presentation is in accord with the theoretical premises of the author; that is, that the organism acts as a whole and that no understanding of behavior at any time can be obtained by a summation of the reactions of the various parts. The whole is more than the sum of its parts. Thus, the second chapter begins with an analysis of social behavior. The author then proceeds to the personality development of the individual. Following, he makes further analyses of the individual's behavior into his emotions, intelligence and problems of learning. Subsequently, he discusses observational behavior and some of its finer aspects and finally the nervous system in its relation to behavior. Certainly the text presents a psychological rather than a logical approach to the study of human behavior.

As a clinical psychologist, I agree with his favorable treatment of the organismic theory of behavior, but I am in considerable disagreement with the author's rather naive and almost lay approach to the technics and theories of psychoanalysis. In his very brief discussion of this field. he shows an amazing ignorance of psychoanalytic theory as well as practice and makes many rash statements. For example:

> In primitive races the first signs of sex interest arising before maturity are directed toward the opposite sex and not, except in unusual cases, toward the individual himself or toward a member of the same sex.

Any student of behavior who has observed masturbatory practices, exhibitionism, and exploration of sexual organs of other children in 3 or 4 year olds, can dispute this statement. Further,

> Time after time advice to adolescents based on Freudian principles has done more damage than good.

One would assume from this statement that "advice" can be given "to adolescents based on Freudian principles." Any psychologist who has an understanding of what is involved in the therapeutic handling of adolescents' problems would never interpret Freudian technics or theories as "advice" to be given to anyone, much less to adolescents. And, again,

> Time after time in the course of reading Freudian literature, youth has been led to imagine personal maladjustments that did not exist.

If such an argument were to be used with respect to medical texts or books on pathology, one might be obliged to discount all of the great work on bacteria and diseases because young people reading the books might imagine they had the disease. On the whole, the author misinterprets concepts concerning psychoanalytic methods which he has apparently learned through reading and which, fundamentally, cannot be properly learned without basic clinical experience.

The author presents some of the usual experimental material corroborating the laws and principles of human behavior as seen from the point of view of the Gestalt psychologist. The reviewer's impression is that while much of the material is valid in certain sections, in others, explanations for behavior are very superficial and frequently disre-

gard motivation as an essential factor in understanding behavior, despite the fact that motivation is supposed to be a major consideration in Gestalt psychology. On the favorable side it might be stated that the book represents, on the whole, a somewhat more desirable trend in psychology from the point of view of organization, as well as from the point of view of its greater emphasis upon the reaction of the organism in its total personality setting.

HENRY HANSBURG

Your Child's Development and Guidance, Told in Pictures—*By Lois Hayden Meek, Ph.D. New York: Lippincott,* 1940. 166 pp. Price, $2.00.

This small, compact book contains information on the subject that one would usually find in several large volumes. The language is simple and direct, without superfluous words or technical phraseology. One feels that the author has comprehensive technical knowledge of her subject, tempered by a very flexible philosophy. Practical, common-sense advice is given with a very real understanding not only of child nature and needs, but also of "parent" nature and needs. She has confidence in the ability of the average parent "to select those things (in the realm of child guidance) that are appropriate and useful for his own child."

She deals with such phases of child development and guidance as the following: physical growth and development from birth to six; daily schedule; habits of eating, sleeping, elimination, and "getting dirty and getting clean again"; social relationships with adults and other children; emotional growth and development.

Part of the charm as well as the educational effectiveness of the book is due to the 101 photographs and 61 line drawings of children, scattered throughout the book, comprising from one-third to one-half of its contents.

A quotation from its first pages may help those seeking an intriguing book on the subject to understand why this one was chosen for review. "One of the most exciting things about children is that they change. The new-born slowly grows into a rollicking one-year-old taking his first steps. The infant becomes a toddler running here, there, and everywhere. The toddler gets steady on his legs, grows tall, loses his front teeth. And on he moves, day by day, year by year, along life's pathway. Mother loses her baby and gains a child, only to see him become a youth with lanky legs and fuzzy face in a few years. It takes wise and flexible parents to be able to keep up to the rapid changes in children's development."

ETHEL GORDON

The Compleat Pediatrician: Practical, Diagnostic, Therapeutic and Preventive Pediatrics—*By W. C. Davison, M.A., M.D. (3rd ed.) Durham, N. C.: Duke University Press,* 1940. 317 pp. Price, $3.75.

The third edition of this comprehensive handbook of up-to-date pediatric information attests its usefulness. It might well be adopted as a *vade mecum* for pediatricians and general practitioners having anything to do with children. This volume, as in previous editions, has brought together the important facts from pediatric literature and has arranged them for ready reference, having in view their practical application.

The preventive trend in pediatrics is emphasized by the space given to nutritional requirements, feeding, diets, growth, development, and child care, and guidance. The book is thoroughly indexed and cross referenced so that it is easy to follow through any symptom or condition occurring in a number of different diseases. Helpful tables are scattered throughout the book, for instance the ones on "Differentiation of

the Most Common Types of Jaundice in Children," and "Contagious or Infectious Diseases." The volume is bound in flexible dark green covers and is a credit to Duke University Press.

RICHARD A. BOLT

A Manual of the Common Contagious Diseases *(3rd ed. rev.)—By Philip M. Stimson. Philadelphia: Lea & Febiger,* 1940. 465 pp. Price, $4.00.

Even though one may prefer the inclusive word communicable in place of the less exact term of contagious diseases there is nothing else to justify an objection to the content or form of this admirable manual, revised and expanded, by one of the very competent clinicians and level headed teachers of practical preventive medicine, to whom health officers and physicians, as well as their associates among nurses in private and public practice, have been so long deeply indebted.

If all physicians knew the exact facts as here described and all health officers made their control procedures consistent with the known period of incubation and communicability there would be less trouble for patient and family and greater respect by the public for the measures taken in its interest.

This book is reliable as a guide to the hospital administrator and nurse educator as well as a competent source of reference for the student and practitioner of medicine.

It is to be highly recommended.

HAVEN EMERSON

Facts About Nursing, 1939—*By The Nursing Information Bureau of the American Nurses' Association, coöperating with the National League of Nursing Education and the National Organization for Public Health Nursing,* 50 W. 50th St., New York, N. Y., 1940. 58 pp. Price, $.25.

Here is a snappy paper-covered booklet, full of meaty facts chiefly about professional nurses in the United States, simply stated, easily read.

Numbers of nurses in the three major fields of nursing are given; their hours of employment, salaries, ratio of population, A.N.A. membership, registration by states, distribution by states, etc., are combined in the shortest possible space in statistical form.

The material is a godsend to busy physicians and others who find themselves face-to-face with the preparation of a commencement address in a nursing school, or with any address or paper in which any phase of nursing is concerned, for it represents hours of reading on this subject boiled down into 58 pages.

EVA F. MACDOUGALL

The Dysenteric Disorders—The Diagnosis and Treatment of Dysentery, Sprue, Colitis and Other Diarrhaeas in General Practice—*By Philip Manson-Bahr, C.P.M.G., D.S.O., M.D., F.R.C.P., with an appendix by W. John Muggleton, M.S.M. Baltimore: Williams and Wilkins,* 1939. 613 pp. with 9 colored and 14 black and white plates, and 106 illustrations in the text. Price, $8.00.

This book by the Director of the Division of Clinical Tropical Medicine of the London School of Hygiene and Tropical Medicine is an important contribution to a field in which etiology is often obscure, diagnosis difficult, and treatment a major problem of clinical medicine. The author has had a notable career particularly devoted to this group of diseases. After five introductory chapters, he takes up in detail the bacillary dysenteries, the protozoal and helminthic dysenteries and diarrheas, other infective diarrheas, the steatorrheas, and other affections producing dysenteric symptoms. One of the most important chapters is that on sigmoidoscopy. Each disease is dealt with in a

logical manner with discussions of etiology, pathological and physiological changes, symptomatology and the evaluation of various forms of treatment. The author has a wide knowledge of the literature and this together with his intimate experience with most of the subjects discussed makes the book a valuable guide to the clinician.

The appendix prepared by Manson-Bahr's assistant for many years is an important laboratory aid in diagnosis. There is a bibliography of 23 pages and a detailed index. One of the best features of the book is the illustrations, many of which present the macroscopic lesions of the tongue and intestine. Those reproduced in color are especially valuable. There are also many reproductions of x-ray pictures of the colon. The drawings of intestinal protozoa have mostly been borrowed from Dobell and Wenyon and are supplemented by two colored plates by the senior author.

Although the British point of view predominates and some forms of treatment vary from approved practices in the United States, the reviewer believes that this book should be available generally in medical libraries and in the offices of practitioners who deal with this group of diseases. It is splendidly printed on glossy paper which takes the illustrations well, and the authors and publishers are to be commended on the result. HENRY E. MELENEY

Exercise and Keep Fit—*By Terry Hunt. New York: Prentice-Hall,* 1940. 202 pp. Price, $1.96.

About half of this text is devoted to general advice on how to keep well: mental health, the use of cathartics, sleep, diet, play, hygienic care of the body, posture, etc.

The balance is made up of descriptions of different exercises—illustrated—mentioning in each case the purpose of that particular exercise. The descriptions and illustrations make the exercise clear.

While these exercises seem clear and foolproof, it is wiser that they be started under expert advice and observation, both as to the total amount and choice of exercises and the proper technic of each. CHARLES H. KEENE

Correction—On page 830 of the July *Journal* an error appeared. Of course, where Sinclair Lewis was mentioned as author of *The Jungle*, Upton Sinclair was intended.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Virus vs. Ultra-violet—In one of two identical children's wards, ultra-violet lamps were installed. The infants in the irradiated-air room had about half as many colds as those in the control room during two seasons of operation. Complications were reduced, too.

BARENBURG, L. H., *et al.* Effect of Irradiation of the Air in a Ward on the Incidence of Infections of the Respiratory Tract. Am. J. Dis. Child. 59, 6:1219 (June), 1940.

Beware C O—Proof is offered that prolonged exposure to carbon monoxide may have damaging effect upon health even though there is no history of severe asphyxiation or loss of consciousness.

BECK, H. G., *et al.* Carbon Monoxide—A Domestic Hazard. J.A.M.A. 115, 1:1 (July 6), 1940.

Care and Feeding of Mosquitoes—How to raise malaria mosquitoes in captivity. Powdered dog biscuit is the larval food, and a shaved rabbit is the daily fare of the more-deadly-than-the-male females.

CROWELL, R. L. Insectary Rearing of Anopheles Quadrimaculatus. Am. J. Hyg. 32, 1:12 (July), 1940.

Accuracy of Census Age Statements—This cross-check on census returns by matching against a subsequent census, person-by-person, suggests that at least 25 per cent of the whites and 40 per cent of the colored individuals must have had their age reported incorrectly at one census or the other. The tendency of under- or over-age statement was studied.

DENSEN, P. M. Family Studies in the Eastern Health District. Am. J. Hyg. 32, 1:1 (July), 1940.

First Line of Defense—Among the many curious items of interest in this paper is the history of maritime quarantine in colonial America when "sickly vessels" or "boats from sickly ports" were ordered to come not nearer than one mile from shore.

HAMPTON, B. C. Development of the National Maritime Quarantine System of the United States. Pub. Health Rep. 55, 28:1241 (July 12), 1940.

History, Lice, and Rats—Though there have been recorded but 500 human cases of plague, it is known that the disease is widely spread among squirrels, chipmunks, wood rats, field mice, prairie dogs, marmots, etc., and that fleas, lice, and ticks on all wild rodents may carry the disease. How soon the infection will reach large cities in the East where the thriving and friendly rat population will again jeopardize their human neighbors is only a matter of conjecture. Plague jumped quarantine bars, spread slowly despite our best efforts. Who is foolish enough to say that it can't burst into a real flame again?

HAMPTON, B. C. Plague in the United States. Pub. Health Rep. 55, 26:1143 (June 28), 1940.

Better Blood Tests—Reported here is the marked improvement in the sensitivity, specificity, and accuracy of the serological tests for syphilis as carried on by the principal state laboratories. This fact and the account of what is being done to effect further improvements in technics should go far to allay the fears of the doubting-Thomases who throw cold water on syphilis control projects that are based

upon blood tests of large groups of our people.

HAZEN, H. H., *et al.* Serodiagnostic Tests for Syphilis as Performed in State Laboratories in 1938 and 1939. Ven. Dis. Inform. 21, 6:171 (June), 1940.

Adequacy of Oral Hygiene Programs—From this study a sort of mathematical formula is deduced: the number of carious processes developing in the teeth of high school children, less the number of fillings installed, seems to bear a set ratio to the number of teeth that are lost, and this is an index of the adequacy of public dental care.

KLEIN, H., and PALMER, C. E. Studies on Dental Caries. Pub. Health Rep. 55, 28:1241 (July 12), 1940.

Measuring Nutritional Deficiencies—About 2,500 high school children in New York City are to be given an examination to determine nutritional status, the examination to consist of 27 different items. Most of these methods of testing have not been applied in large scale nutritional surveys, so it is reasonable to anticipate some interesting findings—which are to be published later.

KRUSE, H. D., *et al.* Medical Evaluation of Nutritional Status. Milbank Quart. 18, 3:257 (July), 1940.

Typhoid Vaccine—About one hundred immunized persons developed typhoid fever. The mortality was 4 per cent against a 10 per cent mortality among non-immunes. Only 14 per cent showed a typical course. This experience occurred in Spain when grossly polluted water was drunk.

MALBIN, B. Typhoid Fever Occurring in Immunized Persons. J.A.M.A. 115, 1:33 (July 6), 1940.

One Dose Not Enough—Thirteen cases of diphtheria in children who had once received a single dose of alum precipitated toxoid are reported; no apparent difference in symptoms was recorded. This is evidence of the value of insisting upon two-dose treatments.

MURPHY, J. N., *et al.* Clinical Cases of Diphtheria Occurring in Patients Who Had Previously Received One Injection of Alum Precipitated Diphtheria Toxoid. Canad. Pub. Health J. 31, 6:276 (June), 1940.

Conclusion Jumping Department—Soldiers from the South have a materially different cancer experience from Yankees. Half the Southerners with cancer had skin primary malignancies whereas only 27 per cent of the Northerners were so affected. Exposure to the intense sun in childhood rather than during the adult years seems to be the cause. It is suggested that exposure to ultra-violet rays in infancy may be one way of forestalling the internal cancers of later years.

PELLER, S., *et al.* Cancer in Its Relations to Climatic Conditions During Childhood and Adolescence. Am. J. Hyg. 32, 1:39 (July), 1940.

Workers Wrapped in Cellophane—Resin film coated fabrics will protect workers from some skin irritants used in industrial processes. A design for the well-dressed employee is offered.

SCHWARTZ, L., *et al.* Clothing for Protection against Occupational Skin Irritants. Pub. Health Rep. 55, 26:1158 (June 28), 1940.

Out from Confusion—During the past year and a half, concludes this paper, 1,500 persons with dietary deficiency diseases have been treated without a death, whereas more than half the pellagrins used to die. This result is attributable to the administration of appropriate vitamin preparations combined with an adequate, well balanced diet.

SPIES, T. D., *et al.* Some Recent Advances in Vitamin Therapy. J.A.M.A. 115, 4:292 (July 27), 1940.

Making the Most of Leisure Time—Health Workers who see the need of more and better mental hygiene will find much of interest in this dissertation on creative leisure time activities for young and old alike.

STIEGLITZ, E. J. Wise Investment of Leisure. Sci. Month. 51, 2:147 (Aug.), 1940.

What Doctors Want To Know—In this order the inquiring doctors asked questions about syphilis: (1) appropriate treatment schedules, (2) choice of drugs, (3) serologic tests, (4) reactions to treatment, (5) accuracy of diagnosis, (6) differential diagnoses, (7) and a poor seventh, control of infectiousness. Congenital syphilis rates seventeenth, and public policy, twenty-seventh.

STOKES, J. H., *et al.* A study of Consultation by Correspondence in Syphilis (with addenda from which this annotation was lifted). Ven. Dis. Inform. 21, 5:129 (May), 1940.

Landmarks in Our National Evolution—Three of six papers included in the first installment give promise of a most illuminating symposium on population trends and social welfare. When the remaining papers are published they will all be bound for your lasting convenience. It would seem that, as we are an aging population, we had better get busy improving the health and productivity of the middle-aged. On the other hand we must strengthen the child health services in some of the more benighted parts of the country.

THOMPSON, W. S. Outstanding Population Trends Affecting Problems of Social Welfare (and two related papers). Milbank Quart. 18, 3:189 (July), 1940.

After the Sanatorium—In Ontario a scheme for the support and after-care of tuberculosis sanatorium graduates has been in effect 2 years, and its value established; not yet has much been done about rehabilitation.

WICKS, C. A. The Post Sanatorium Care of Tuberculous Patients in Ontario. Canad. Pub. Health J. 31, 6:259 (June), 1940.

Anent Rabies Vaccination—Much of the rabies vaccine now being produced appears to have little antigenic value, but this finding will doubtless have little dampening effect upon the perennial enthusiasm of the proponents of canine vaccination.

WYCKOFF, R. W. G., and BECK, C. E. The Potency of Anti-rabic Vaccines. J. Immunol. 39, 1:17 (July), 1940.

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DERMATOLOGY AND SYPHILOLOGY FOR NURSES, INCLUDING SOCIAL HYGIENE. By John H. Stokes. 3d ed. rev. Philadelphia: Saunders, 1940. 365 pp. Price, $2.75.

PREVENTIVE MEDICINE. By Mark F. Boyd. 6th ed. Philadelphia: Saunders, 1940. 588 pp. Price, $4.50.

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MANUAL OF MEDICAL AND SURGICAL EMERGENCIES. J. C. Geiger, Editor. San Francisco: Stacey, 1940. 199 pp. Price, $2.50.

INFLUENCE OF A PUBLIC HEALTH PROGRAM ON A RURAL COMMUNITY: Fifteen Years in Rutherford County, Tenn., 1924–1938. By W. Frank Walker and Carolina R. Randolph. New York: Commonwealth Fund, 1940. 106 pp. Price, $.25.

THE DEVELOPMENT OF PUBLIC HEALTH IN CANADA. Edited by R. D. Defries. Toronto: Canadian Public Health Association, 1940. 184 pp. Price, $1.25.

THE CRIPPLED CHILD IN NEW YORK CITY. Report of the Commission for Study of Crippled Children, City of New York, 1940. 218 pp.

HELPING ADULTS TO LEARN. By John Chancellor, Editor. Chicago: American Library Association, 1939. 296 pp. Price, $3.00.

MANSON'S TROPICAL DISEASES. By Philip H. Manson-Bahr, Editor. 11th ed. Baltimore: Williams & Wilkins, 1940. 1083 pp. Price, $11.00.

INDUSTRIAL MICROBIOLOGY. By Samuel Cate Prescott and Cecil Gordon Dunn. New York: McGraw-Hill, 1940. 541 pp. Price, $5.00.

A RESEARCH CONFERENCE ON THE CAUSE AND PREVENTION OF DENTAL CARIES. Sponsored by The Good Teeth Council for Children, Inc., Chicago, 1938. 178 pp. Price, $2.00.

NATIONAL COMMITTEE ON MATERNAL HEALTH. Report on the Sex Question by the Swedish Population Commission. Translated and Edited by Dr. Hamilton. Baltimore: Williams & Wilkins, 1940. 182 pp. Price, $2.00.

RHEUMATIC FEVER: Studies of the Epidemiology, Manifestations, Diagnosis, and Treatment of the Disease During the First Three Decades. By May G. Wilson. New York: Commonwealth Fund, 1940. 595 pp. Price, $4.50.

SAFE AND HEALTHY LIVING. By J. Mace Andress and I. H. Goldberger, et al. New York: Ginn & Co., 1939.

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The Health Parade	.72
Growing Big and Strong	.76
Safety Every Day	.76
Doing Your Best for Health	.80
Building Good Health	.84
Helping the Body in Its Work	.84
The Healthy Home and Community	.88

AIR HYGIENE FOUNDATION OF AMERICA, INC. Proceedings of Fourth Fall Meeting, November 14–15, 1939, Pittsburgh, Pa.

GETTING READY TO BE A MOTHER. By Carolyn C. Van Blarcom. (4th ed. rev.) New York: Macmillan, 1940. 190 pp. Price, $2.50.

MOSQUITO CONTROL: Practical Methods for Abatement of Disease Vectors and Pests. By William Brodbeck Herms and Harold Farnsworth Gray. New York: Commonwealth Fund, 1940. 317 pp. Price, $3.50.

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THE CHANGING TASK OF THE SCHOOL PHYSICIAN. By Benjamin Spock. New York: Progressive Education Association, 1940. Price, $.50

THIRTY-THIRD ANNUAL REPORT OF THE METROPOLITAN WATER BOARD, 1938. By Lt.-Col. E. F. W. Mackenzie, O.B.E., M.C., M.B., D.P.H. London: P. S. King & Son, Ltd., 14, Great Smith Street (Westminster), 1940. 118 pp. Price, $2.75.

FIGHTING QUACKS WITH FACTS. A manual of educational technics for use in venereal disease quack control programs, with a summary of factual data and a listing of educational materials. By Howard Ennes. Special V. D. Education Circular No. 1, July 1, 1940. Washington: Federal Security Agency, U. S. Public Health Service. 21 pp.

Dearborn Inn

Detroit Entertainment

THE meeting of the American Public Health Association in Detroit will not be all work and no play, according to the plans of the Michigan Committee.

Members who arrive on Sunday may attend the broadcast of the Sunday Evening Hour in Masonic Temple through the courtesy of the Ford Motor Company. A block of 500 seats for members of the Association has been reserved, and in order that those who wish to attend may be sure to have a ticket the committee suggests that reservations may be made now through the secretary of the committee at 3919 John R. Street, Detroit, Mich.

The ladies will receive particular attention on Monday afternoon when a tea will be held in their honor in the Esquire Room of the Book-Cadillac Hotel.

The Michigan Public Health Association is combining its meeting for this year with that of the Association, and its business meeting, which will be a luncheon meeting, will be held on Monday at 12:30 P.M. in the Crystal Ballroom of the Book-Cadillac Hotel. It is planned at this luncheon to honor former presidents of the Association.

On Monday evening the National Organization for Public Health Nursing will honor Miss Grace Ross, their president, who has been director of nursing for the Detroit Department of Health for 25 years. A dinner is planned, with the well known writer and speaker Margaret Culkin Banning to discuss "A Citizen Looks at Public Health." An invitation is extended to all members of the Association who wish to attend.

The Women's Entertainment Committee invites the visiting ladies to view an exhibit at the Art Institute on Wednesday as part of a trip, and to have tea at the Grosse Pointe Yacht Club before returning to the hotels. The trip will cover the east side of Detroit and will follow the river and the lake to the Yacht Club, which is a show place extending out into Lake St. Clair.

The First General Session, which will include a hand of welcome from Michigan to members of the Association, will be followed by a reception to the President and President-elect, and dancing in the ballroom of the Statler Hotel.

Sessions will be suspended on Thursday afternoon in order that those who

Masonic Temple

wish to visit Greenfield Village in Dearborn may be free to do so. Busses will leave the Book-Cadillac Hotel at 1 P.M., and go directly to Greenfield Village where a sightseeing tour will be conducted which will include the Edison Institute, a memorial to Abraham Lincoln, the transplanted scenes of periods in Edison's life, the Cotswold Cottage, the Martha and Mary Chapel, and many other points of interest in the early life of this country which were picked up and set down as examples of the pioneer spirit of America. Following the trip through the village, tea will be served to the visitors at Dearborn Inn which is close by.

On Wednesday evening the Michigan Public Health Association will be responsible for a General Session at which will be demonstrated and broadcast on the air an actual dramatic radio presentation. The Detroit News Players will be responsible for this presentation, and the broadcast is made

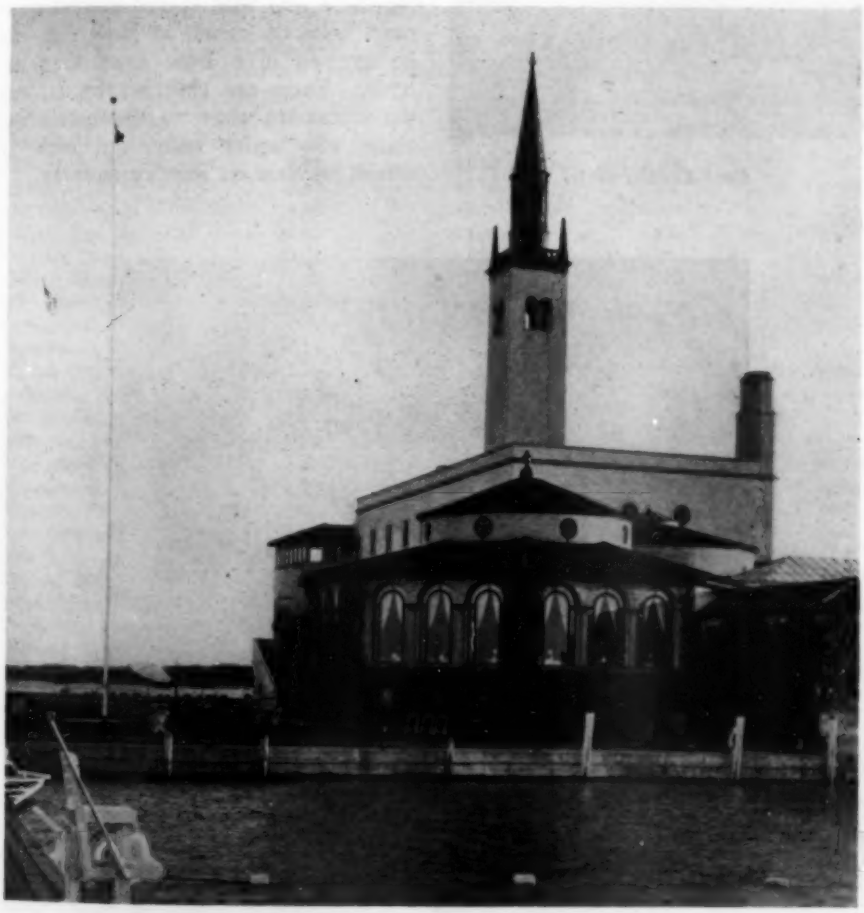
Radio Station WWJ Studios

possible through the courtesy of Radio Station WWJ and its manager, Mr. William J. Scripps. A speaker of nation-wide importance will complete the program.

The Annual Banquet, which will be held in the Grand Ballroom of Hotel Statler, will be followed by features which will include the presentation of diplomas to those persons who at one time were members of the staff of the Detroit Department of Health and who have gone on to other fields of endeavor in public health. Dancing will follow the dinner.

Arrangements have been made for busses to be available to take groups to River Rouge to the factory of the Ford Motor Company and to that of the Plymouth Division of the Chrysler Corporation. In addition the Chrysler Corporation is promising a trip for the ladies who attend the meeting to their main plant.

Various organizations in Detroit interested in public health and child welfare have arranged for inspection visits and teas for those who are particularly interested in specific activities. Information may be obtained at the



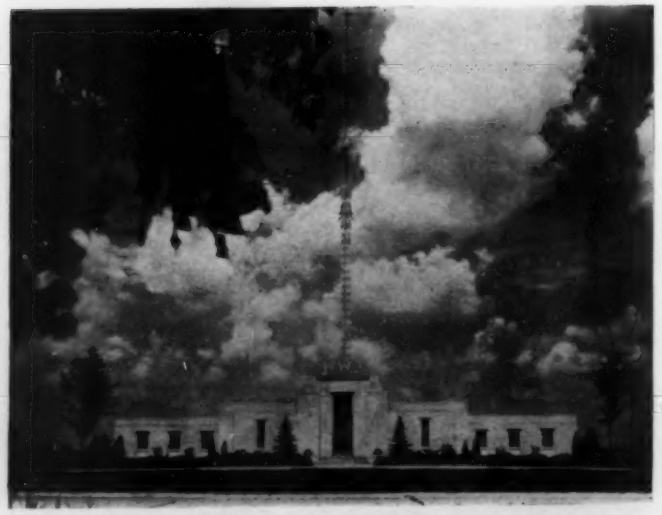
Grosse Pointe Yacht Club

Book-Cadillac Hotel

Association desk regarding these points of interest, and appointments will be made for those who care to visit these institutions.

There are any number of good restaurants in Detroit within walking distance of the downtown hotels, and the largest theaters are situated in the same immediate vicinity. Radio Station WWJ invites members to visit their studios and be present at broadcasts. One session of the Public Health Education Institute on radio will be held in the WWJ studios.

Arrangements for golf privileges have been made with local golf clubs, and for those who wish to run around nine short holes the course at Belle Isle can be covered in a little more than an hour. There are churches of various denominations close to the hotels for those who arrive early and wish to attend services on Sunday morning.



Radio Station WWJ Transmitting Station

ASSOCIATION NEWS

SIXTY-NINTH ANNUAL MEETING

DETROIT, MICH., OCTOBER 8–11, 1940

HEADQUARTERS

Book-Cadillac Hotel and Hotel Statler

RAILROAD FARES FROM VARIOUS POINTS TO DETROIT, MICH.

AMERICAN PUBLIC HEALTH ASSOCIATION

OCTOBER 8–11, 1940

From	*One-way Pullman Travel*	*Round trip Pullman Travel*	*One-way Lower*	*One-way Upper*
Atlanta, Ga.	$22.24	$36.40	$5.80	$4.40
Baltimore, Md.	18.00	33.70	4.50	3.10
Boston, Mass.	23.30	42.75	5.25	3.60
Buffalo, N. Y.	8.40	15.10	2.10	1.45
Chicago, Ill.	8.55	16.65	2.65	1.80
Cleveland, Ohio	4.90	9.65	2.65	1.80
Dallas, Tex.	34.92	56.35	8.95	6.80
Denver, Colo.	39.61	63.25	9.45	7.20
Duluth, Minn.	21.85	37.20	5.25	4.00
Fort Worth, Tex.	34.92	56.35	8.95	6.80
Indianapolis, Ind.	8.05	15.70	2.65	1.80
Jacksonville, Fla.	32.42	51.80	8.40	6.40
Kansas City, Mo.	22.33	37.35	5.25	4.00
Louisville, Ky.	11.20	20.80	3.15	2.20
Los Angeles, Calif.	74.71	106.95	18.90	14.40
Memphis, Tenn.	22.40	37.30	5.80	4.40
Milwaukee, Wis.	11.10	20.50	3.20 *	2.35 *
Minneapolis, Minn.	20.39	35.00	4.50	3.40
Nashville, Tenn.	17.01	28.60	5.30	3.80
New Orleans, La.	32.90	52.85	8.40	6.40
New York, N. Y.	21.50	39.75	4.50	3.10
Omaha, Nebr.	23.11	39.10	5.80	4.40
Philadelphia, Pa.	19.40	36.25	4.50	3.10
Pittsburgh, Pa.	8.85	17.25	2.65	1.80
Portland, Ore.	72.89	106.95	18.40	14.00
Salt Lake City, Utah	53.34	76.45	13.40	10.20
San Francisco, Calif.	74.71	106.95	18.90	14.40
Seattle, Wash.	72.89	106.95	18.40	14.00
St. Louis, Mo.	14.90	26.30	3.15	2.20
Washington, D. C.	18.00	33.70	4.50	3.10
Montreal, Que.	19.25	34.65	4.20	2.90
Halifax, N. S.	40.60	69.25	8.95	6.70
Ottawa, Ont.	16.25	29.25	4.10	3.05
Quebec, P. Q.	24.90	44.80	6.20	4.50
Toronto, Ont.	7.75	13.95	2.10	1.45
Vancouver, B. C.	72.89	106.95	19.20	14.60

* Seat to Chicago

Detroit Art Center

DETROIT HOTELS

Hotel	Room Capacity	Single Room: Without Bath	Single Room: With Bath	Double Room: Without Bath	Double Room: With Bath
Abington	336		$3.00 up		$4.00–$5.00
Barlum	800		2.00 "		3.00– 4.00
Belcrest	400		3.00 "		4.00– 5.00
Book-Cadillac	1,200		3.00 "		5.00– 6.00
Briggs	200		2.00 "		3.00– 4.00
Detroit Leland	800		2.50 "		4.00– 5.00
Fairbairn	400	$1.25	2.50 "	$2.50	3.00– 3.50
Fort Shelby	900		2.50 "		4.00– 5.00
Imperial	200		2.00 "		2.50– 3.50
Lee Plaza	475		3.00 "		5.00– 6.00
Norton	250	1.25	2.00 "	$2.50–$2.75	3.00– 4.00
Palmetto	324		2.50 "		4.00– 5.00
Prince Edward, Windsor	250		2.50 "		4.00– 5.00
Savarine	500	1.50	2.25 "	$2.50	3.25– 5.00
Statler	1,000		3.00 "		5.00– 5.50
Tuller	800		2.00 "		3.50– 4.50
Wardell	650		3.00 "		4.50– 5.50
Webster Hall	800	1.50	2.00 "	2.50	3.50– 4.00
Whittier	850		3.00 "		4.50– 5.00
Wolverine	500		1.50 "		2.50– 4.00

.....(Cut off on this line and mail to the hotel of your choice).....

HOTEL RESERVATION BLANK FOR THE DETROIT MEETING AMERICAN PUBLIC HEALTH ASSOCIATION, OCTOBER 8–11, 1940

To .....
(Name of Hotel)

Please reserve for me ..... rooms for ..... persons for the A.P.H.A. Meeting.

Single room ..... Double room .....

Maximum rate per day for room $..... Minimum rate per day for room $.....

I expect to arrive ..... If date of arrival is changed I will notify you at least 24 hours in advance.

Please acknowledge this reservation.

Name .....

Street address .....

City ..... State .....

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Charles G. Baker, M.D., 212 N. Upper, Lexington, Ky., Assistant Health Officer, Fayette County Health Dept.

Frederick F. Brown, M.D., M.P.H., St. Mary Parish Health Center, Franklin, La., Deputy Health Officer

John M. Byers, M.D., 15½ Ralston Ave., Hyattsville, Md., Assistant County-Deputy Health Officer, Prince George's County Health Dept.

Glen W. McDonald, M.D., M.P.H., 1124 East Eighth, Ada, Okla., Director, City-County Health Unit

Louis G. Moench, M.D., City and County Bldg., Provo, Utah, Deputy State Health Commissioner

Lailor A. Morrogh, M.D., Avoyelles Health Unit, Marksville, La., Director

Benjamin B. Robbins, M.D., 47 Main St., Bristol, Conn., City Health Officer

Laboratory Section

Walter J. Beichert, M.D., 302 Ashland Place, Brooklyn, N. Y., Charge of Orthopedic Dept. and Laboratory Work, Lindsay Laboratories

Joseph P. Cleary, M.D., City Hall, Portland, Ore., Director of Laboratories, Bureau of Public Health

William W. Ferguson, M.S., Bureau of Laboratories, State Health Dept., Lansing, Mich., Senior Bacteriologist

Mary K. Gurley, Berkeley Inn, Haste at Telegraph Ave., Berkeley, Calif., Bacteriologist, Sonoma County Health Dept.

George F. Ilg, M.Sc., 1325 Potrero Ave., San Francisco, Calif., Field and Laboratory Work, Borden's Dairy Delivery Company

Clifford B. Line, D.V.M., Bureau of Laboratories, State Health Dept., Lansing, Mich., Assistant Director

Albert W. Morriss, M.A., City-County Health Dept., Tyler, Tex., Chief Technician, Malarial Investigation Division, State Health Dept.

Mary Nimlos, B.A., Rm. 606 City Hall, Milwaukee, Wis., Senior Bacteriologist, Health Dept.

John W. Shiel, 94–11 Springfield Blvd., Queens Village, L. I., N. Y., Director, Shiel Laboratory

Julia C. Sullivan, A.B., 82 Arlington St., Haverhill, Mass., Laboratory Technician, Health Dept.

Vital Statistics Section

Marion F. Cure, 1954 Grand Ave., St. Paul, Minn., Statistician, State Dept. of Health

Helen H. Dahl, 312 City Hall, Atlantic City, N. J., Acting Registrar, Dept. of Health

Doris L. Duxbury, B.A., Mayo Clinic, Rochester, Minn., Statistician for Morbidity Report for Mayo Clinic and Hospitals

Mary S. Edwards, B.A., Rm. 922, 50 West 50 St., New York, N. Y., Statistician and Assistant Director, American Social Hygiene Assn.

Stanley G. Hanks, M.S., C.P.H., 2302 Van Lennen Ave., Cheyenne, Wyo., Director, Bureau of Vital Statistics, State Dept. of Health

Irene C. Haviland, 24 Myrtle Ave., Newark, N. J., Assistant Statistician, New York Tuberculosis and Health Assn.

W. G. Johnson, A.B., Rm. 960, 20 N. Wacker Drive, Chicago, Ill., Chief Statistician, National Safety Council

Ella A. Mead, M.D., Coronado Blk., Greeley, Colo., Registrar of Vital Statistics, Wild County

Florence E. Olson, A.B., 1215½ West Adams St., Phoenix, Ariz., Vital Statistician, State Board of Health

Pearce Shepherd, Ph.B., Prudential Insurance Co., Newark, N. J., Assistant Actuary

Alba B. Smith, R.N., 509 N. E. 64 St., Miami, Fla., Deputy Registrar and Statistician, Bureau of Vital Statistics, Health Dept.

Engineering Section

John E. Brewer, B.S.A.E., City Health Dept., 105 Courthouse, Memphis, Tenn., Junior Engineer

William J. Dixon, B.S. in C.E., 2300 McCoy St., Kansas City, Mo., Sanitary Engineer, Health Dept.

Henry Greene, M.S.P.H., 152 Rust Ave., Big Rapids, Mich., Sanitarian, Mecosta-Osceola Health Dept.

Ralph R. Hobbs, 1324 N. Euclid, Tucson, Ariz., Sanitarian, Pima County Health Dept.

Alfred E. Regelsen, B.S. in C.E., 547 Cauldwell Ave., New York, N. Y., Junior Sanitary Engineer, New York State Conservation Dept.

Leonard O. Williams, Jr., M.S., State Health Dept., Cheyenne, Wyo., State Sanitary Engineer

Lawrence E. Wood, B.S. in C.E., 425 Locust St., Marion, Kans., Sanitary Engineer, Marion County Health Dept.

Industrial Hygiene Section

Starling D. Steiner, M.D., M.P.H., Brooke County Health Dept., Wellsburg, W. Va., Health Officer

Commander Charles S. Stephenson, M.D., 4457 Que St., N.W., Washington, D. C., In Charge, Division of Preventive Medicine, Navy Dept.

Elmer P. Wheeler, B.S. in Chem., 12 Park St., Concord, N. H., Industrial Hygiene Engineer, State Board of Health

Food and Nutrition Section

Franklin A. Clark, D.V.M., 519 Dexter Ave., Montgomery, Ala., Director, Division of Inspection, State Health Dept.

Dorothy B. Hacker, M.A., 51 W. Warren Ave., Detroit, Mich., Nutritionist, Visiting Nurse Assn.

Helen A. Hunscher, Ph.D., 2023 Adelbert Rd., Cleveland, Ohio, Head, Home Economics Dept., Western Reserve University

Kenneth R. Lennington, B.A., 416 Federal Annex, Atlanta, Ga., Junior Food and Drug Inspector, U. S. Food and Drug Administration

William C. Moeser, A.B., 605 K. St., National City, Calif., San Diego County Food Inspector

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Maternal and Child Health Section

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Public Health Education Section

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Helen Crosby, A.B., 330 Fourth Ave., New York, N. Y., Chief, Bureau of Social and Health Agencies, Metropolitan Life Insurance Co.

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Raymond Howe, D.D.S., Cody, Wyo., Member, State Board of Health

Henry Pleasants, Jr., M.D., 18 West Chestnut St., West Chester, Pa., Medical Director, State Teachers College

Josephine B. Weills, B.A., 30 Keene Way, Medford, Ore., President, Jackson County Public Health Assn.

J. Kenneth Winter, P.D., 2117 Peach St., Erie, Pa., Executive Secretary, Erie County Health and Tuberculosis Assn.

Public Health Nursing Section

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Milenka Herc, 51 West Warren, Detroit, Mich., Mental Hygiene Consultant and Assistant Director, Detroit Visiting Nurse Assn.

Frances M. Hersey, M.A., State Health Dept., Cheyenne, Wyo., Supervisory Nurse

Margaret L. Howe, B.S., Gilman, Ill., District Public Health Nurse

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Ruby E. Wood, R.N., State Dept. of Health, Albany, N. Y., Consultant Public Health Nurse, Division of Maternity and Child Health

Epidemiology Section

Margaret W. Baggett, R.N., P. O. Box 371, Montgomery, Ala., Special Nurse, Tuberculosis Studies, U. S. Public Health Service

O. Merton Derryberry, M.D., M.P.H., Wilson Dam, Ala., Epidemiologist, Tennessee Valley Authority

Clarence R. Letteer, Jr., M.D., 102 Dwyer, San Antonio, Tex., Epidemiologist, Health Dept.

Richard Nauen, M.D., New York State Hospital, Ray Brook, N. Y., Senior Tuberculosis Hospital Physician

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Unaffiliated

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Samuel F. Jenkins, M.D., M.S.P.H., 35–13–103 St., Corona, L. I., N. Y., Special Worker (WPA), Bureau of Social Hygiene, New York City Dept. of Health

Jean B. R. Koupal, M.D., M.S.P.H., 303 East 161 St., New York, N. Y., Physician, Health Dept.

J. L. Swigert, M.D., Republic Bldg., Denver, Colo.

APPLICANTS FOR FELLOWSHIP

In accordance with the By-laws of the Association, the names of applicants for Fellowship are officially published herewith. They have requested affiliation with the Sections indicated. Action by the various Section Councils, the Committee on Eligibility and the Governing Council will take place between now and the Detroit Annual Meeting.

Health Officers Section

Richard M. Adams, M.D., M.P.H., Superintendent of Health, Tulsa, Okla.

Harry S. Allen, M.D., Health Commissioner, Ironton, Ohio

Albert C. Baxter, M.D., Director, State Health Department, Springfield, Ill.

Charles F. Blankenship, M.D., M.P.H., P. A. Surgeon, U. S. Public Health Service, San Francisco, Calif.

Walter H. Bruce, M.D., Director, Jefferson County Health Unit, Pine Bluff, Ark.

Frank A. Calderone, M.D., M.P.H., District Health Officer, Department of Health, New York, N. Y.

Frank M. Carroll, M.D., Commissioner of Health, Seattle, Wash.

Charles D. Cawood, M.D., M.P.H., City of Lexington and Fayette County Health Officer, Lexington, Ky.

Robert L. Cherry, M.D., M.P.H., Director, Tyler-Smith County Health Unit, Tyler, Tex.

Roy L. Cleere, M.D., C.P.H., Secretary and Executive Officer, State Board of Health, Denver, Colo.

John E. Dunn, M.D., M.S.P.H., P. A. Surgeon, U. S. Public Health Service, Washington, D. C.

Cecil R. Fargher, M.D., M.P.H., Health Officer, Clark County-City Health Dept., Vancouver, Wash.

Robert E. Fox, M.D., M.P.H., Director of County Health Work, State Board of Health, Raleigh, N. C.

John D. Fuller, M.D., C.P.H., Santa Cruz County and City Health Officer, Santa Cruz, Calif.

Eugene A. Gillis, M.D., M.P.H., Epidemiologist and Venereal Disease Consultant, State Health Department, Oklahoma City, Okla.

Lloyd M. Graves, M.D., Superintendent of Health, Memphis, Tenn.

Charles C. Hedges, M.D., City-County Health Officer, Savannah, Ga.

Robert D. Higgins, M.D., M.P.H., Director of Health, Boyd County Health Department, Ashland, Ky.

Ernest E. Huber, M.D., M.P.H., Commissioned Officer, U. S. Public Health Service, Washington, D. C.

Frederick W. Kratz, M.D., P. A. Surgeon, U. S. Public Health Service, New York, N. Y.

Arthur E. Lien, M.D., Spokane County Health Officer, Spokane, Wash.

Burdge P. MacLean, M.D., Deputy Commissioner, Suffolk County Department of Health, Huntington, L. I., N. Y.

Elroy F. McIntyre, M.D., C.P.H., Director of Venereal Disease Control, State Health Department, Santa Fe, N. M.

Wallace S. Petty, M.D., Director, Woodbury County Health Service, Sioux City, Ia.

Carl V. Reynolds, M.D., Secretary and State Health Officer, State Board of Health, Raleigh, N. C.

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Raymond A. Vonderlehr, M.D., Assistant Surgeon General in Charge, Division of Venereal Diseases, U. S. Public Health Service, Washington, D. C.

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Laboratory Section

Gerard Laviano, M.D., Director, Woodside Medical Laboratory, Woodside, L. I., N. Y.

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Industrial Hygiene Section

Paul A. Brehm, M.D., Supervisor, Industrial Hygiene, State Board of Health, Madison, Wis.

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Don D. Irish, Ph.D., Director, Biochemical Research Laboratory, Dow Chemical Company, Midland, Mich.

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Guillermo Lage y Fernandez, M.D., C.P.H., Assistant Director, Section of Scientific Investigations, Finlay Institute, Havana, Cuba.

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Francis C. Lawler, Sc.D., Assistant Professor of Bacteriology and Public Health, University of Oklahoma, Oklahoma City, Okla.

Theodore R. Meyer, M.D., Dr.P.H., Health Commissioner, St. Louis, Mo.

Joseph G. Molner, M.D., M.P.H., Director, School Health Service, Department of Health, Detroit, Mich.

Lowell S. Selling, M.D., Dr.P.H., Ph.D., Director, Psychopathic Clinic of the Recorder's Court, Detroit, Mich.

Henry H. Smach, Ph.D., Director, Suburban Laboratories, Inc., Cicero, Ill.

HEALTH CONSERVATION CONTEST HONOR ROLL FOR SYPHILIS AND TUBERCULOSIS

THE Chamber of Commerce of the United States and the American Public Health Association announce that in connection with the 1940 City Health Conservation Contest, eligible cities may qualify for the Honor Roll for noteworthy achievement in the fields of tuberculosis and syphilis control.

Any city enrolled in the regular Contest is eligible for placement on ***either*** or ***both*** the syphilis and the tuberculosis Honor Rolls.

These Honor Rolls are being set up in the belief that some cities may have particularly effective programs in some special field even though their entire programs may not be of an equally high standard.

Application blanks for the Health Conservation Contest Honor Rolls for syphilis and tuberculosis may be obtained from either the American Public Health Association or the Chamber of Commerce of the United States. The syphilis and tuberculosis questionnaires will be forwarded upon receipt of a filled out application blank. For further particulars, write to the American Public Health Association, 50 West 50th Street, New York, N. Y.

EMPLOYMENT SERVICE

The Association Employment Service seeks to bring to the attention of appointing officers the names of qualified public health personnel and to act as a clearinghouse on employment. This is a service of the Association conducted without expense to employer or employee.

From the registry of persons available, selected announcements are published from time to time. Appointing officers may obtain lists of all registrants on request.

Positions Available

Experienced bacteriologist and serologist (female) to direct and supervise serum preparation in a large institution. **W464**

The Municipal Civil Service Commission of the City of New York makes announcement of an examination for Assistant Engineer (Designer), Grade 4, Board of Water Supply. This will be open to all qualified citizens of the United States, and will be held in New York, Boston, and Knoxville. Salary $3,120 per annum, and upward. Closing date for applications: September 23, 1940. Write: Municipal Civil Service Commission, 299 Broadway, New York, N. Y.

Positions Wanted

ADMINISTRATIVE

Unusually well trained physician, Dr.P.H., Harvard, background of laboratory research and experimental epidemiology, wishes opportunity to acquire field administrative experience under good auspices. **A460**

Physician, with Dr.P.H. degree, who has had 6 years' experience as public health administrator, seeks administrative position in full-time city or city-county health department. **A367**

Physician, M.P.H., Harvard, a student of maternal problems, wishes position preferably with teaching opportunities. **A461**

Physician, 32; M.D., 1936; postgraduate course in venereal disease control, experienced as district health officer and in organizing and publicizing syphilis control campaign; now employed in charge venereal disease clinics in metropolitan health department; seeks venereal disease control post with opportunity to organize or administer program. **A437**

Well qualified physician, with M.P.H. from Johns Hopkins, and experienced as county health officer, and now assistant health officer in a large city, will consider county or city administrative position. **A383**

Physician, M.P.H., Harvard; well experienced in city and rural health administration, will consider appointment as district health officer or in city or state health department. **A418**

HEALTH EDUCATION

Young woman with splendid educational background, graduate of M.I.T. health education courses; M.A., Columbia University; seeks position in health education or nutrition. **H462**

Unusually well qualified young woman with background in health education and nutrition is available for immediate appointment in state or local agency. Best references. **H459**

Young woman, Ph.D., Columbia University, splendid background of experience in health education, will consider position as director of public health education. **H294**

Woman, M.D., Boston University; special work Columbia and Massachusetts Institute of Technology; 1 year's experience in state hospital; interested in psychiatry, desires position in the East in hospital for mental diseases or industrial school. **H247**

LABORATORY

Young man, bacteriologist, especially trained in viruses and rickettsiae and all phases of public health laboratory work; Sc.D., Johns Hopkins; now assistant state laboratory director; qualified to consider teaching, executive, administrative, or research position; particularly interested in and qualified for practical laboratory methods with viruses, desires position. **L451**

Bacteriologist, serologist, B.S., M.A. degrees; 2 years' experience foods, dairy, and biochemistry in public health laboratory, desires position in research or routine. **L454**

Bacteriologist, M.S.P.H., University of Michigan; 2½ years as serologist in private hospital; desires work as serologist or bacteriologist in public health laboratory. Willing to start modestly. **L425**

Woman bacteriologist; B.A., Chemistry, 1933; 5 years' experience in experimental and practical therapeutics including animal work, desires position in public health field. **L394**

SANITARY ENGINEERING

Public health engineer, B.S. in Sanitary Engineering from Massachusetts Institute of Technology; experienced in Massachusetts, Connecticut and Kentucky, seeks position as sanitary or public health engineer with health department. **E380**

Engineer, aged 28, 3 years' experience as district sanitation supervisor, state department of health, together with work on plumbing, heating, and ventilation, will consider position in the plumbing and heating field or state department of health. Prefers middle western or western states. **E453**

MISCELLANEOUS

Woman physician, honor graduate in public health, and with training in mental hygiene; seeks a permanent or temporary position in mental hygiene. Prepared for residence studies. Excellent references. **M465**

Advertisement

Opportunities Available

PUBLIC HEALTH PHYSICIAN — To assist director of department of public health in university medical school; Master's or Doctor's degree public health desirable; teaching experience required; about $4,000. PH-90, Medical Bureau, Palmolive Building, Chicago.

PUBLIC HEALTH PHYSICIANS—(a) County health officer; rural section of South; Southerner preferred; $275. (b) County health officer; man with experience in public health work or willingness to acquire public health training with expenses paid eligible; $3,000, plus $600 travel allowance. (c) County health officer; $2,700–$3,600, plus $600 travel allowance, payable monthly; man under 35 required; must own car; opportunity for postgraduate training, advancement in field of public health. (d) Venereal disease clinician; $3,000–$3,900; South. (e) City health physician; all types of public health service except venereal disease and tuberculosis; central city of 250,000; $2,700. PH-91, Medical Bureau, Palmolive Building, Chicago.

STUDENT HEALTH PHYSICIANS—(a) Small but well known southern college; four physicians on staff; duties include medical care of men, consultations, teaching, x-ray supervision; stimulating program. (b) Student health fellowship; 2 year appointment; $1,500, maintenance, for 9 month appointment, first year; $2,250, second year; eastern university. (c) Central university with enrollment of approximately 3,000; excellent university hospital; 9 month appointment; $3,000, increasing to 3,500. (d) Western state college; physician with year's internship eligible; $2,600. (e) Western university; 1 year appointment, including month's vacation; $2,400. PH-92, Medical Bureau, Palmolive Building, Chicago.

PUBLIC HEALTH NURSES—(a) Public health nurse for important position with state department of public health instruction; must be thoroughly experienced in health and physical education; B.S. degree required, Master's preferred. (b) Two for county health appointments; $1,800, $600 travel allowance; southwest. (c) Graduate nurse with degree to serve as counselor in exclusive school for young women; must be 25–30; midsouth. PH-93, Medical Bureau, Palmolive Building, Chicago.

OUTPATIENT DEPARTMENT SUPERVISORS —(a) Fully approved hospital of 300 beds; vicinity nation's capitol. (b) Fairly large general hospital on Atlantic seaboard; nurse with outpatient and accident department experience, 30–35 preferred. (c) University hospital; about $110, maintenance; minimum 2 years' experience in outpatient department clinic supervising required, degree desirable. PH-94, Medical Bureau, Palmolive Building, Chicago.

RESEARCH BACTERIOLOGIST — State Department of health; duties include study of methodology as it pertains to public health bacteriology; Ph.D. or D.Sc. degree required; vicinity $3,000. PH-95, Medical Bureau, Palmolive Building, Chicago.

Situations Wanted

PUBLIC HEALTH PHYSICIAN—B.S., M.D. degrees, university medical school; C.P.H., Johns Hopkins; active in many branches of State Department of Public Health for 10 years; under 40; for further information, please write Burneice Larson, Director Medical Bureau, Palmolive Building, Chicago.

PUBLIC HEALTH NURSE—B.S., Columbia; graduate of a New England training school; nearly 15 years' experience in public health nursing and social service work; 9 years, executive secretary and director of nursing, important organization; for further information, please write Burneice Larson, Director, Medical Bureau, Palmolive Building, Chicago.

PUBLIC HEALTH NURSE — Fairly recent graduate of midwestern training school; certified public health nursing; will receive special teachers' certificate upon completion present courses in university medical school; for further details, please write Burneice Larson, Director, Medical Bureau, Palmolive Building, Chicago.

NEWS FROM THE FIELD

STUDY TO EVALUATE ORIGINAL SEROLOGIC TESTS FOR SYPHILIS

MORE than five years ago the Committee on Evaluation of Serodiagnostic Tests for Syphilis, in cooperation with the United States Public Health Service, conducted a study to evaluate original serologic tests for syphilis or modifications thereof in the United States. The results of this study were published shortly after the investigation was completed.[1]

Consideration is now being given by the committee to the organization of a second evaluation study of original serologic tests for syphilis or modifications thereof within the next year. If the need for an investigation of this kind seems to justify the cost, invitations will be extended to the authors of such serologic tests who reside in the United States, or who may be able to participate by the designation of a serologist who will represent them in this country. The second evaluation study will be conducted utilizing methods comparable to those employed in the first study.[2]

Serologists who have an original serologic test for syphilis or an original modification thereof and who desire to participate in the second evaluation study should submit their applications not later than October 1, 1940. The applications must be accompanied by a complete description of the technic of the author's serologic test or modification. All correspondence should be directed to the Surgeon General, United States Public Health Service, Washington, D. C.

REFERENCES

1. *Ven. Dis. Inform.*, Washington. June, 16:189, 1935. *J.A.M.A.*, Chicago. June 8, 104:2083, 1935.
2. *J.A.M.A.*, Chicago. Dec. 1, 103:1705, 1934.

FEDERAL COÖRDINATORS OF HEALTH AND WELFARE NAMED

A COMMITTEE to coördinate the health and public welfare efforts of four government agencies in behalf of the national defense program has been announced by Harriett Elliott, member of the U. S. Defense Commission in charge of consumer protection.

The members of the committee are:

Thomas Parran, M.D., Surgeon General of the U. S. Public Health Service, public health and medical problems; Katherine Lenroot, Chief of the Children's Bureau, Department of Labor, child welfare; Arthur J. Altmeyer, Chairman, Social Security Board, social security and welfare; M. L. Wilson, Ph.D., Director, Extension Service, Department of Agriculture, nutrition problems.

The appointment of Gay Shepperson of Atlanta, Ga., as an assistant to work with the coördinators on problems of health and welfare, is also announced; Miss Shepperson was WPA State Administrator for Georgia.

According to Commissioner Elliott, the committee will emphasize the importance of maintaining and improving the standards of health and welfare to the end that citizens may be physically prepared for their responsibilities.

NATIONAL CITIZENS COMMITTEE OF THE WHITE HOUSE CONFERENCE ORGANIZED

A NATIONAL Citizens Committee of the White House Conference on Children in a Democracy has been organized in accordance with the recommendations adopted by the Conference at its closing session on January 20, 1940. Frances Perkins, Chairman of the Conference and Secretary of Labor, appointed an Organizing Committee consisting of Homer Folks, Chairman, William G. Carr, Mrs. Saidie

Orr Dunbar, Rev. Bryan J. McEntegart, and Henry F. Helmholz, M.D.

At its organization meeting the National Citizens Committee adopted objectives of coöperation with official agencies, dissemination of information about the conference and its recommendations, stimulation and aid in the development of state follow-up programs, and the consideration of the special needs of children growing out of emergency conditions.

The present committee consists of 25 persons with Marshall Field, Chairman, Homer Folks, Vice-Chairman, M. O. Bousfield, M.D., Secretary, and James E. West, Treasurer. Headquarters of the Committee are at Room 710, 105 E. 22nd Street, New York, N. Y. Miss H. Ida Curry is Acting Director.

NEW YORK STATE CONFERENCE ON SOCIAL WORK, 1940

THE 1940 New York State Conference on Social Work will be held in New York City, at the Hotel Pennsylvania, October 8–11, inclusive, preceded on the 7th and 8th by the usual Conference Institutes. The Reverend Bryan J. McEntegart, Director of the Division of Children, Catholic Charities of the Archdiocese of New York, is president of the Conference this year. The central theme of the Conference will be "The Child," but all main divisions of social and welfare work will be represented.

Registration may be made and full information obtained by writing to Mary B. Holsinger, Executive Secretary of the Conference, Box 1740, Albany, N. Y.

IDAHO PUBLIC HEALTH ASSOCIATION WILL HOLD FIRST ANNUAL MEETING

IT is announced that the first annual meeting of the Idaho Public Health Association will be held at Twin Falls, Idaho, September 9–10.

HARVARD UNIVERSITY AND AMERICAN RED CROSS ESTABLISH WARTIME HOSPITAL IN ENGLAND

THE American Red Cross and Harvard University announced on August 18 the establishment of a 100 bed hospital in England for the study and treatment of communicable diseases under wartime conditions. The President of Harvard University announced also the formation of a Harvard Public Health Unit for field and laboratory work in epidemiology in Great Britain. The funds for the hospital and the unit will be provided by the American Red Cross and Harvard will furnish the medical staff.

According to the announcement the purpose of the undertaking will be to acquire information relating to the control of influenza and other diseases under unusual or wartime conditions, and the organization of temporary mobile hospitals.

Dr. John E. Gordon, Professor of Preventive Medicine and Epidemiology in the Harvard Medical School, and Dr. John R. Mote of Boston are already in England at the invitation of Hon. Malcolm MacDonald, British Minister of Health.

ASHFORD AWARD IN TROPICAL MEDICINE

AT the annual meeting of the American Society of Tropical Medicine held recently in Memphis, Tenn., the Bailey K. Ashford Award in Tropical Medicine was established by Eli Lilly & Co. to be awarded in alternate years for a total of three times. The award will be $1,000 and a bronze medal suitably engraved. An additional amount of $150 or as much thereof as may be necessary is available toward traveling expenses for the recipient of the award.

It will be given biennially in recognition of demonstrated research in the field of tropical medicine, taking into

consideration independence of thought and originality. The investigator must be a citizen of the United States and less than 35 years of age on January 1 of the year in which the award is made. The recipient must not be associated with a commercial laboratory and need not be a member of the American Society of Tropical Medicine. All nominations must be in the hands of the secretary of the Society at least 60 days before the dates of the annual meeting when the award is being made.

DEATH OF A. J. DOUGLAS, M.D.

DR. A. J. DOUGLAS, for many years Health Officer of Winnipeg, Canada, died on June 30, 1940, less than a month after he had attended a meeting of the Medical Faculty of Manitoba Medical College, which honored him with four other retired members by the presentation of a bronze plaque in recognition of his long service on the Faculty.

Dr. Douglas was born in Ekfrid, Ontario, and was a graduate of Manitoba Medical College. After a year as interne in Winnipeg General Hospital he took postgraduate work in London. He was granted the honorary degree of LL.D. by his alma mater in 1937. He became Winnipeg's first full-time medical officer of health at the age of 26, and served for 40 years. When he took up his work in 1900, typhoid fever was epidemic in Winnipeg.

PERSONALS

Central States

REAVES W. DECROW,† of Columbus, Ohio, has been appointed Health Officer of Clinton County.

DR. LINDSEY J. ERVIN, Director of the Venereal Disease Service at Broadlawns General Hospital, Des Moines, Iowa, has been named temporary director of the Polk County Health Unit. He succeeds DR. EDWIN N. HESBACHER, recently appointed to the staff of the U. S. Marine Hospital in Detroit, Mich., who served as Director of the health unit for a year.

DR. GEORGE E. FRENCH has retired after 37 years as Health Officer of Elyria, Ohio.

MILLARD C. HANSON, M.D., DR.P.H.,* Health Director of Toledo, Ohio, since April, 1937, has resigned to become Director of a syphilis control program in Pittsburgh.

T. M. KOPPA, M.D., C.P.H.,† of the Bureau of Epidemiology, Michigan State Department of Health, Lansing, has been appointed Director of the Tuberculosis Division of that Bureau. He succeeds ARTHUR W. NEWITT, M.D., C.P.H.†

HAROLD A. ROBINSON, M.D.,† of Elyria, Ohio, has been appointed Health Officer of Elyria, succeeding DR. GEORGE E. FRENCH, who has retired.

Eastern States

DR. HOWARD S. ALLEN, of Woodbury, Conn., has been appointed Health Officer of Bethlehem.

DR. JAMES SAMUEL BINKLEY, of New York, N. Y., has been appointed Assistant Managing Director of the American Society for the Control of Cancer, effective June 1.

ALFRED L. BURGDORF, C.P.H., M.D.,† of Hartford, Conn., has been appointed Health Officer of Hartford, to succeed Benjamin G. Horning, M.D., M.P.H.,* who has resigned to join the staff of the American Public Health Association under the Committee on Administrative Practice.

BRUNO F. W. GEBHARD, M.D.,† formerly Technical Consultant for the medical public health exhibits at the New York World's Fair in connection

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* Fellow A.P.H.A.
† Member A.P.H.A.

with the American Museum of Health, has been appointed Director of the Cleveland Health Museum and Associate of the Western Reserve University in Health Education. Dr. Gebhard was formerly the Curator of the German Hygiene Museum in Dresden.

ALBERT D. KAISER, M.D.,† of Rochester, N. Y., has been appointed by Governor Lehman to be a member of the temporary legislative commission to formulate a long range health program, succeeding the late DR. THOMAS P. FARMER, of Syracuse.

DR. FRANCIS BRAE RAFFERTY, of Willimantic, Conn., has been appointed Health Officer of Lebanon.

Southern States

NORMAN G. ANGSTADT, M.D.,† of Fayetteville, W. Va., recently Health Officer of Hancock and Wetzel Counties, has been appointed Health Officer of Fayette County. He succeeds LEON A. DICKERSON, M.D.,† who resigned to join the staff of the State Health Department.

HIRAM J. BUSH, M.D.,† of the U. S. Public Health Service, has been named Director of the Henry R. Carter Memorial Laboratory for Malarial Research, Savannah, Ga. He succeeds THOMAS H. D. GRIFFITTS, Sr. Surgeon,† recently transferred to Puerto Rico as Chief Quarantine Officer. DR. CHARLES M. MCGILL has been Acting Director of the laboratory since Dr. Griffitts' departure.

BENJAMIN F. BYRD, M.D.,† of Nashville, Tenn., has been appointed Medical Director of the National Life and Accident Insurance Company, Nashville, to succeed the late DR. RUFUS E. FORT.

TURNER E. CATO, M.D.,† of Charleston, W. Va., for many years Health Officer of Kanawha County, has been given charge of a newly established public health unit in Dade County, Fla., with headquarters in Miami.

FRANK V. CHAPPELL, M.D., has resigned as Director of the Bureau of Local Health Service of the Florida State Board of Health, to accept the position of Director of the Pinellas County Health Department.

AUBREY Y. COVINGTON, M.D.,† of Morganfield, Ky., has resigned as Health Officer of Union County, to take a similar post in Scott County, with headquarters in Georgetown. He succeeds CARL M. GAMBILL, M.D.,† who has joined the staff of the Kentucky State Health Department.

GEORGE B. DAVIS, M.D.,† of Glasgow, Ky., recently Health Officer of Barren County, has been appointed to a similar position in Hart County, with headquarters at Horse Cove.

HAROLD M. ERICKSON, M.D.,† of The Dalles, Ore., has been appointed Director of the Division of Maternal and Child Health in the Oregon State Board of Health, to succeed GEORGE D. CARLYLE THOMPSON, M.D.,† of Portland, who resigned to take a position with the U. S. Children's Bureau.

DR. ROSCOE FAULKNER, of Trenton, Tenn., has been appointed Health Officer of Williamson County, to succeed DON C. PETERSON, M.D.,* of Franklin, who has been appointed Director of Vital Statistics in the State Health Department.

ALFRED H. FLETCHER,* Sanitary Engineer of the Department of Health, Memphis, Tenn., has been appointed Associate in Sanitary Engineering, at the School of Hygiene and Public Health of the Johns Hopkins University, Baltimore, Md., effective August 15. Mr. Fletcher has served

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† Member A.P.H.A.

with the International Health Division of the Rockefeller Foundation and with the U. S. Public Health Service before he joined the staff in Memphis. Mr. Fletcher will be associated with DR. ABEL WOLMAN, Professor of Sanitary Engineering.

L. J. HANCHETT, M.D., Acting Director of the Bureau of Venereal Disease Control of the Florida State Board of Health, has been appointed Director of the Bureau of Local Health Service.

TASWELL PAUL HANEY, JR., M.D.,* who has been on leave of absence the past year from his position as Director of the Pike County Health Department, McComb, Miss., has been appointed Director of Maternal Hygiene and Child Welfare of the Mississippi State Board of Health.

DR. GEORGE W. JACKSON, of Western State Hospital, has been appointed Health Officer of Bedford County, Tenn.

LESTER M. PETRIE, M.D.,† has been transferred from the Southwestern Health Region, Albany, Ga., to the Northeastern Health Region, Gainesville.

WILLIAM H. PICKETT, M.D.,* of Clearwater, Fla., has resigned as Director of the Health Department of Pinellas County. He has been appointed Assistant State Health Officer, with the Florida Department at Jacksonville.

ALBERT M. PRICE, M.D.,† head of the Division of Communicable Diseases in the State Department of Health, Charleston, W. Va., has been appointed Health Officer of Kanawha County, to succeed TURNER E. CATO, M.D.,† who was recently appointed Health Officer of Dade County, Fla.

GUY V. RICE, M.D.,† of Jesup, Ga., has resigned as Commissioner of Health in Wayne County, and will succeed LESTER M. PETRIE, M.D.,† as Regional Medical Director of the Southwestern Health Region.

GEORGE E. RILEY, M.D., C.P.H.,† of Jackson, Miss., Director of Malaria Control Work in the Mississippi State Health Department, has been named in charge of Pike County.

DR. CLYDE F. ROSS, of Richmond, Va., has been appointed Venereal Disease Control Officer of Richmond, succeeding DR. FRANCIS W. UPSHUR.

EDWIN H. SCHORER, M.D., DR.P.H.,* resigned as Director of Health of Kansas City, Mo., effective May 23.

DR. DONALD B. THURBER, of Louisville, Ky., has been appointed Health Officer of Nicholas County, with headquarters at Carlisle, succeeding DR. JAMES W. SCUDDER, who has been appointed to the staff of the Western State Hospital, Hopkinsville.

CHARLES L. WILLIAMS, M.D.,† Assistant Surgeon General, U. S. Public Health Service, will have charge of the newly established health district unit with headquarters in New Orleans to supervise public health service work in Texas, Louisiana, Florida, Alabama, Georgia, Mississippi, and Tennessee.

DR. DAVID B. WILSON, of McComb, Miss., who has been Acting Director of the Pike County health unit, has accepted a position with the U. S. Public Health Service.

Western States

FRANK J. BAILEY, M.D.,† who formerly served as Health Officer of Red Bluff, Calif., has again been appointed to the position, succeeding DR. RUSSELL G. FREY.

BERTRAM P. BROWN, M.D., of Los Angeles, has been appointed Director of the California State Department of Public Health, to succeed WALTER M. DICKIE, M.D., PH.D.,† of San Francisco.

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* Fellow A.P.H.A.
† Member A.P.H.A.

HORACE DELIEN, M.D.,† Special Physician in Tuberculosis Control, has been assigned to duty in the office of the District Medical Director, U. S. Indian Service, San Francisco, to assume direction of tuberculosis control activities among the Indian population of California. Dr. DeLien has recently completed one year of educational experience at the Henry Phipps Institute of Philadelphia, previous to which he was in charge of the Indian Service Sanatorium at Fort Bidwell, Calif. (now discontinued). Dr. DeLien's activities will be extended to include tuberculosis control among Indians in Nevada and Utah in the near future.

CRANFORD H. DOUTHIRT, M.D.,† of Santa Fe, N. M., has been appointed Health Officer of the State of New Mexico, succeeding EDWIN B. GODFREY, M.D.,† resigned.

GUY S. MILLBURY, D.D.S.,* who since 1914 has been Dean of the University of California College of Dentistry, San Francisco, retired as of July 1, and will live at Los Gatos, Calif. Dr. Millbury is immediate Past President of the Western Branch American Public Health Association.

GEORGE M. STEVENS, M.D.,* Epidemiologist of the Department of Health of the City of Los Angeles, Calif., is retiring.

DEATHS

DR. S. ADOLPHUS KNOPF, of New York, N. Y., died July 15, at the age of 82. He was active or honorary officer of many important tuberculosis associations, and was the author of many books and pamphlets on tuberculosis.

CHARLES F. MEBUS,† of Glenside, Pa., eminent engineer and former President of Abington Township Board of Commissioners, died June 28, at the age of 75.

CHARLES F. NASSAU, M.D., Sc.D.,† of Philadelphia, Pa., former Health Commissioner, died on August 11.

DAVID RIESMAN, M.D., Sc.D., LL.D., of Philadelphia, Pa., died recently. He was Emeritus Professor of Medicine and Professor of the History of Medicine at the University of Pennsylvania.

DR. JOSEPH W. SCHERESCHEWSKY, of Atlanta, Ga., died recently. He was particularly active in cancer research and in the establishment of state cancer clinics and organized the long-range cancer control program of Georgia.

* Fellow A.P.H.A.
† Member A.P.H.A.

CONFERENCES AND DATES

American Association of Public Health Dentists. Cleveland, Ohio. September 8–9.

American College of Physicians—25th Annual Session. Statler Hotel, Boston, Mass. April 21–25, 1941.

American Association of State Highway Officials. Seattle, Wash. September 15–19.

American Association of State Registration Executives. Detroit-Leland Hotel, Detroit, Mich. October 8–11.

American Dental Association. Cleveland, Ohio. September 9–13.

American Dietetic Association — 23rd Annual Convention. Pennsylvania Hotel, New York, N. Y. October 20–24.

American Education Week (20th annual observance), November 10–16. Theme: "Education for the Common Defense."

American Hospital Association. Boston, Mass. September 16–20.

American Public Health Association —69th Annual Meeting. Book-Cadillac Hotel, Statler Hotel, Detroit, Mich. October 8–11.

American Public Works Association. Detroit, Mich. September 30–October 2.

American School Health Association. Book-Cadillac Hotel and Hotel Statler, Detroit, Mich. October 7–11.

American Social Hygiene Association. Book-Cadillac Hotel, Detroit, Mich. October 6.

American Society of Civil Engineers—Fall Meeting. Cincinnati, Ohio. October 16–18.

American Water Works Association:

Virginia Section—Monroe Hall, University of Virginia, Charlottesville, Va. September 5–6.

Michigan Section — University of Michigan Union, Ann Arbor, Mich. September 11–13.

Rocky Mountain Section — Cosmopolitan Hotel, Denver, Colo. September 16–17.

Western Pennsylvania Section — Castleton Hotel, New Castle, Pa. September 18–20.

New York Section—Hotel Commodore, New York, N. Y. September 25.

Wisconsin Section — Hotel Manitowoc, Manitowoc, Wis. October 14–16.

Southwest Section — Mayo Hotel, Tulsa, Okla. October 14–17.

New Jersey Section—Madison Hotel, Atlantic City, N. J. October 18–19.

Kentucky-Tennessee Section — Lafayette Hotel, Lexington, Ky. October 21–23.

California Section—Los Angeles Biltmore Hotel, Los Angeles, Calif. October 23–26.

West Virginia Section — Prichard Hotel, Huntington, W. Va. October 24–26.

North Carolina Section—Sir Walter Raleigh Hotel, Raleigh, N. C. October 28–30.

Four States Section—Hotel Dupont, Wilmington, Del. November 7–8.

Minnesota Section—St. Paul Hotel, St. Paul, Minn. November 7–8.

Missouri Valley Section—Hotel Fontenelle, Omaha, Nebr. November 13–15.

Arizona Sewage and Waterworks Association — Fall Meeting. Safford, Ariz. October 4–6.

Association of Women in Public Health. Hotel Statler, Detroit, Mich. October 9.

Association of American Medical Colleges. Ann Arbor, Mich. October 28–30.

Canadian Public Health Association—29th Annual Meeting. Winnipeg, Man. September 23–28.

Civil Service Assembly of the United States and Canada. Cleveland, Ohio. September 30–October 4.

Dairy Industries Supply Association. Atlantic City, N. J. October 21–26.

Federation of Sewage Works Associations—First Annual Convention, in conjunction with the 1940 Annual Meeting of the Central States Sewage Works Association. Hotel Sherman, Chicago, Ill. October 3–5.

Florida Public Health Association. Tampa, Fla. December 5–7.

Government Research Association. Princeton, N. J. September 4–7.

Idaho Public Health Association—First Annual Meeting. Twin Falls, Idaho. September 9–10.

Indiana State Medical Association. French Lick Springs Hotel, French Lick, Ind. October 29–31.

Institute on Science and the Nation's Food. Wellesley College, Wellesley, Mass. October 24–26.

International Association of Milk Sanitarians. Joint Meeting with the New York State Association of Dairy and Milk Inspectors. Hotel Pennsylvania, New York, N. Y. October 17–19.

International City Managers' Association. Colorado Springs, Colo. September 23–26.

International Society for Crippled Children. Asheville, N. C. October 6–9.

International Society of Medical Health Officers. Hotel Statler, Detroit, Mich. October 6.

Interstate Post-Graduate Medical Assembly. Cleveland, Ohio. October 13–19.

Michigan Public Health Association. Book-Cadillac Hotel and Hotel Statler, Detroit, Mich. October 7–11.

Michigan Society for Mental Hygiene, Inc.—Annual Conference. Grand Rapids, Mich. October 10–12.

Municipal Public Health Engineers. Hotel Statler, Detroit, Mich. October 6–8.

National Association of Public School Business Officials. Detroit, Mich. October 14–18.

National Chemical Exposition—sponsored by the Chicago Section of the American Chemical Society. Stevens Hotel, Chicago, Ill. December 11–15.

National Organization for Public Health Nursing. Hotel Statler, Detroit, Mich. October 7.

National Pest Control Association—8th Convention. Indianapolis, Ind. October 28–30.

National Recreation Congress—25th. Statler Hotel, Cleveland, Ohio. September 30–October 4.

National Restaurant Association. Chicago, Ill. October 7–11.

National Safety Council. Chicago, Ill. October 7–11.

New Jersey Health and Sanitary Association, Inc. 66th Annual Meeting. Hotel Berkeley-Carteret, Asbury Park, N. J. November 15–16.

New York State Conference on Social Work. Hotel Pennsylvania, New York, N. Y. October 8–11.

Pacific Coast Plumbing Inspectors Association—11th Annual Convention. Sainte Clare Hotel, San Jose, Calif. October 10–12.

Pan-American Congress of Ophthalmology. Hotel Cleveland, Cleveland, Ohio. October 11–12.

Society of American Bacteriologists. St. Louis, Mo. December.

State Directors of Health Education. Book-Cadillac Hotel, Detroit, Mich. October 7.

State Directors of Local Health Services. Book-Cadillac Hotel, Detroit, Mich. October 10.

State Directors of Public Health Nursing. Book-Cadillac Hotel, Detroit, Mich. October 7.

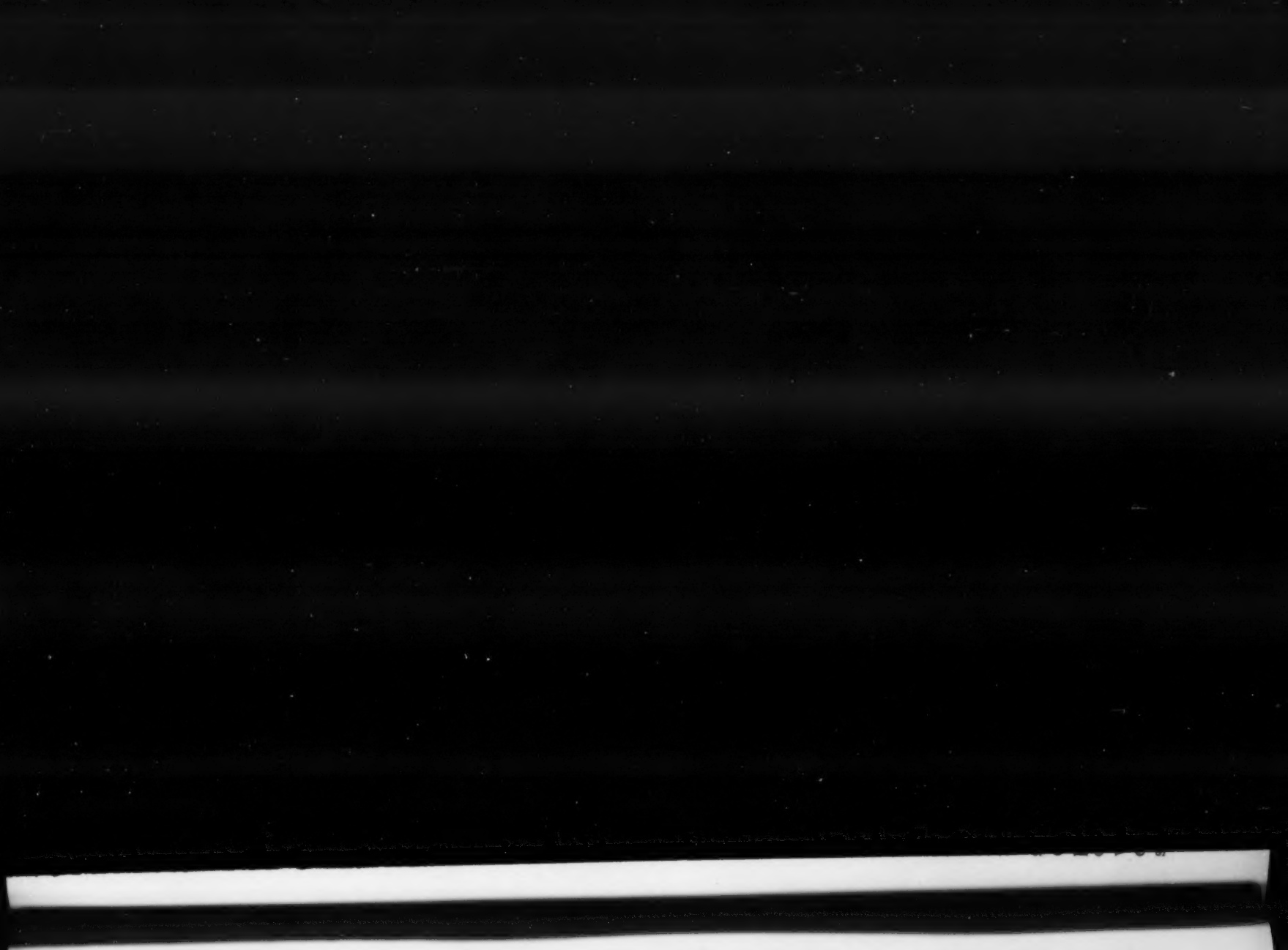
Symposium on Industrial Health, under the sponsorship of the Department of Preventive Medicine, Medical College of Virginia. Baruch Auditorium in the Egyptian Building, Medical College, Richmond, Va. September 12–13.

Texas Public Health Association. Fort Worth, Tex. September 30–October 2.

Tri-State Conference of Food and Health Officials. Pittsburgh, Pa. October.

United States Conference of Mayors—1940 Annual Conference. Waldorf-Astoria Hotel, New York, N. Y. September 19–21.

University of Chicago, Chicago, Ill. Fiftieth Anniversary Year: October 1, 1940–September, 1941.

University of Pennsylvania: Bicentennial Conference—Fine Arts, Humanities, Medical Sciences, Natural Sciences, Religion, Social Sciences. University of Pennsylvania, Philadelphia, Pa. September 16–20.

West Virginia Public Health Association. Morgan Hotel, Morgantown,